**Common VVC Methods (Command Distribution Methods)** –Quick Reference

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| [**await\_completion**](#await_completion) (vvc\_target, vvc\_instance\_idx, [vvc\_channel,] [wanted\_idx,] [timeout, [msg, [scope]]]) |
| Example: await\_completion(SBI\_VVCT, 1, 100 ns, “Waiting for all SBI commands to complete”); |

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| [**enable\_log\_msg**](#enable_log_msg) (vvc\_target, vvc\_instance\_idx, [vvc\_channel,] msg\_id, [msg, [quietness, [scope]]]) |
| Example: enable\_log\_msg(UART\_VVCT, 1, RX, ID\_BFM); |

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| [**flush\_command\_queue**](#flush_command_queue) (vvc\_target, vvc\_instance\_idx, [vvc\_channel,] [msg, [scope]]) |
| Example: flush\_command\_queue(AXILITE\_VVCT, 1); |

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| [**fetch\_result**](#fetch_result) (vvc\_target, vvc\_instance\_idx, [vvc\_channel,] wanted\_idx, result, [fetch\_is\_accepted,] [msg, [alert\_level, [scope]]]) |
| Example: fetch\_result(SBI\_VVCT, 1, v\_idx, v\_result, v\_fetch\_is\_accepted); |

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| [**insert\_delay**](#insert_delay) (vvc\_target, vvc\_instance, [vvc\_channel,] delay, [msg, [scope]]) |
| Example: insert\_delay(SBI\_VVCT, 1,100 ns);  Example: insert\_delay(UART\_VVCT, 1, TX, 10); -- 10 Clock cycles delay using the VVC clk |

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| [**terminate\_current\_command**](#terminate_currant_command) (vvc\_target, vvc\_instance\_idx, [vvc\_channel, [msg, [scope]]]) |
| Example: terminate\_current\_command(SBI\_VVCT, 1); |

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| [**terminate\_all\_commands**](#terminate_all_commands) (vvc\_target, vvc\_instance\_idx, [vvc\_channel, [msg, [scope]]]) |
| Example: terminate\_all\_commands(UART\_VVCT, 1, RX); |

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| [**get\_last\_received\_cmd\_idx**](#get_last_received_cmd_idx) (vvc\_target, vvc\_instance, [vvc\_channel, [scope]]) |
| Example: v\_cmd\_idx := get\_last\_received\_cmd\_idx (SBI\_VVCT, 1);  Example: v\_cmd\_idx := get\_last\_received\_cmd\_idx (UART\_VVCT, 1, RX); |

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| [**await\_any\_completion**](#await_any_completion) (vvc\_target, vvc\_instance\_idx, [vvc\_channel,] [wanted\_idx,] lastness, [timeout, [msg, [await\_completion\_idx, [scope]]]]) |
| Example: await\_any\_completion(SBI\_VVCT, 1, NOT\_LAST, 100 ns, “Add SBI\_VVC#1 to the await\_any\_completion group”);  await\_any\_completion(SBI\_VVCT, 2, LAST, 100 ns, “Add SBI\_VVC#2 as the last member of the group: Waiting until the first in the group completes their commands”); |

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| [**disable\_log\_msg**](#disable_log_msg) (vvc\_target, vvc\_instance\_idx, [vvc\_channel,] msg\_id, [msg, [quietness, [scope]]]) |
| Example: disable\_log\_msg(SBI\_VVCT, 1, ID\_BFM); |



UVVM methods - target parameters

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| **Name** | **Type** | **Example(s)** | **Description** |
| vvc\_target | t\_vvc\_target\_record | UART\_VVCT | VVC target type compiled into each VVC in order to differentiate between VVCs. |
| vvc\_instance\_idx | Integer | 1 | Instance number of the VVC used in this method |
| vvc\_channel | t\_channel | TX, RX or ALL\_CHANNELS | The VVC channel of the VVC instance used in this method |
| void | t\_void | VOID | An empty input parameter for procedure waiting for UVVM to be initialized. |

UVVM methods - functional parameters

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| **Name** | **Type** | **Example(s)** | **Description** |
| wanted\_idx | natural | 50 | The index to be fetched or awaited |
| timeout | time | 100 ns | The maximum time to await completion of a specified command, or all pending commands. An alert of severity ERROR will be triggered if the awaited time is equal to the specified timeout. |
| msg | string | “Awaiting CR from UART” | A message parameter to be appended to the log when the method is executed. |
| msg\_id | t\_msg\_id | ID\_SEQUENCER | The ID to enable/disable with enable/disable\_log\_msg(). For more info, see the UVVM-Util documentation. |
| result | t\_vvc\_result | v\_result | The output where the fetched data is to be placed with fetch\_result() |
| fetch\_is\_accepted | boolean | v\_fetch\_is\_accepted | Output containing a Boolean that states if the fetch command was accepted or not. Will be false if the specified command index has not been stored. |
| alert\_level | t\_alert\_level | TB\_WARNING | The alert level used for the alert which occurs when a fetch\_result() command is not accepted |
| delay | time or natural | 100 ns or 10 | Delay to be inserted in the insert\_delay() procedure, either as time or number of clock cycles |
| quietness | t\_quietness | QUIET | The logging of the command can be turned off by setting quietness=QUIET. |
| scope | string | “Sequencer 1” | A string describing the scope from which the log/alert originates. |

UVVM VVC Framework command broadcasting

Commands in UVVM can be distributed to all instances of a VVC or to all VVCs using dedicated parameters.

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| **Command Parameter** | **Description** |
| **VVC\_BROADCAST** | The VVC\_BROADCAST command parameter can be used when a command is to target all VVCs within the test environment, reducing the number of command instructions needed in the testbench.  Example**:**  enable\_log\_msg(VVC\_BROADCAST, ALL\_MESSAGES); -- enable logging for all VVCs  await\_completion(VVC\_BROADCAST, 10 us); -- wait for all VVCs to complete |
| **ALL\_INSTANCES** | The ALL\_INSTANCES command parameter can be used when a command is targeting all instances of a VVC within the test environment, reducing the number of command instructions needed in the testbench.  Example**:**  enable\_log\_msg(SBI\_VVCT, ALL\_INSTANCES, ALL\_MESSAGES); -- enable logging for all instances of SBI\_VVCT  await\_completion(SBI\_VVCT, ALL\_INSTANCES, 100 ns); -- wait for all instances of SBI\_VVCT to complete |
| **C\_VVCT\_ALL\_INSTANCES** | See description above. C\_VVCT\_ALL\_INSTANCES = ALL\_INSTANCES.  Warning! This command parameter might be removed in a future release and we encourage the use of ALL\_INSTANCES. |

UVVM VVC Framework Common Methods details

All VVC procedures are defined in the UVVM VVC framework common methods package, td\_vvc\_framework\_common\_methods\_pkg.vhd

# UVVM VVC Framework Common Methods details and examples

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| **Method** | **Description** |
| **await\_completion()** | **await\_completion(vvc\_target, vvc\_instance, timeout, msg, scope)**  **await\_completion(vvc\_target, vvc\_instance, wanted\_idx, timeout, msg, scope)**  **await\_completion(vvc\_target, vvc\_instance, vvc\_channel, timeout, msg, scope)**  **await\_completion(vvc\_target, vvc\_instance, vvc\_channel, wanted\_idx, timeout, msg, scope)**  Tells the VVC to await the completion of either all pending commands or a specified command index.  A message with log ID ID\_IMMEDIATE\_CMD\_WAIT will be logged before waiting, and a message with log ID ID\_IMMEDIATE\_CMD will be logged at the end of the wait.  The procedure will report an alert if not all commands have completed within the specified time, *timeout*. The severity of this alert will be TB\_ERROR.  It is also available as a broadcast to all VVCs.  Examples:  await\_completion(SBI\_VVCT, 1, 16 ns, "Await execution. For single entry queue", C\_SCOPE);  await\_completion(SBI\_VVCT, 1, v\_cmd\_idx, 100 ns, "Wait for sbi\_read to finish", C\_SCOPE);  Broadcast:  await\_completion(VVC\_BROADCAST, 100 ns, "Wait for all VVCs to finish", C\_SCOPE); |
| **await\_any\_completion()** | **await\_any\_completion(vvc\_target, vvc\_instance, lastness, timeout, msg, await\_completion\_idx, scope)**  **await\_any\_completion(vvc\_target, vvc\_instance, wanted\_idx, lastness, timeout, msg, await\_completion\_idx, scope)**  **await\_any\_completion(vvc\_target, vvc\_instance, vvc\_channel, lastness, timeout, msg, await\_completion\_idx, scope)**  **await\_any\_completion(vvc\_target, vvc\_instance, vvc\_channel, wanted\_idx, lastness, timeout, msg, await\_completion\_idx, scope)**  Adds a VVC to the await\_any\_completion group, so that the sequencer can wait until **any** VVC in the group completes.  In the same way as await\_completion, each await\_any\_completion call can specify that the VVC in question shall wait for either all pending commands (default) or a specified command index (wanted\_idx parameter).  When the sequencer calls await\_any\_completion with ‘lastness’ = NOT\_LAST, it is not blocked so that it can continue adding members to the await\_any\_compleiton group by calling await\_any\_completion for each VVC.  When the sequencer calls await\_any\_completion with ‘lastness’ = LAST, the sequencer is blocked until **any** of the VVCs in the group are done waiting for their command(s) to complete.  The optional parameter await\_completion\_idx is useful for separating the groups when calling await\_any\_completion from multiple sequencers simultaneously:  Each VVC in the group will log a message with ID ID\_IMMEDIATE\_CMD\_WAIT before waiting, and a message with log ID ID\_IMMEDIATE\_CMD at the end of the wait.  The procedure will report an alert if not all commands have completed within the specified time, *timeout*. The severity of this alert will be TB\_ERROR.  The following example is a sequence of calls that results in waiting until the **first** of the 3 VVCs completes:  await\_any\_completion(SBI\_VVCT, 1,NOT\_LAST, 1 ms, "Adding SBI VVC to group: waits until all commands are complete", C\_SCOPE);  await\_any\_completion(AXISTREAM\_VVCT, 3, v\_cmd\_idx, NOT\_LAST, 1 ms,   "Adding AXI VVC#3 to group: this VVC will wait until v\_cmd\_idx is complete", C\_SCOPE);  await\_any\_completion(AXISTREAM\_VVCT, 4, LAST, 1 ms,  "Adding AXI VVC#4 and concluding group. Will now wait for first VVC in group", C\_SCOPE);  Limitations:   * While forming a group using await\_any\_comletion(..NOT\_LAST) calls followed by (…LAST) call, do not send other commands to the affected VVCs in between these calls. * Multiple sequencers cannot call await\_any\_completion() on the same VVC instance simultaneously. |
| **disable\_log\_msg()** | **disable\_log\_msg(vvc\_target, vvc\_instance, msg\_id, msg, quietness, scope)**  **disable\_log\_msg(vvc\_target, vvc\_instance, vvc\_channel, msg\_id, msg, quietness, scope)**  Instruct the VVC to disable a given log ID. This call will be forwarded to the UVVM Utility Library disable\_log\_msg function. For more information about the disable\_log\_msg() method, please refer to the UVVM-Util QuickRef.  It is also available as a broadcast to all VVCs.  Examples:  disable\_log\_msg(SBI\_VVCT, 1, ID\_LOG\_BFM, “Disabling SBI BFM logging”);  disable\_log\_msg(UART\_VVCT, 1, TX, ID\_LOG\_BFM, “Disabling UART TX BFM logging”, NON\_QUIET, C\_SCOPE);  Broadcast:  disable\_log\_msg(VVC\_BROADCAST, ALL\_MESSAGES, "Disables all messages in all VVCs", NON\_QUIET, C\_SCOPE); |
| **enable\_log\_msg()** | **enable\_log\_msg(vvc\_target, vvc\_instance, msg\_id, msg, quietness, scope)**  **enable\_log\_msg(vvc\_target, vvc\_instance, vvc\_channel, msg\_id, msg, quietness, scope)**  Instruct the VVC to enable a given log ID. This call will be forwarded to the UVVM Utility Library enable\_log\_msg function. For more information about the enable\_log\_msg() method, please refer to the UVVM-Util QuickRef.  It is also available as a broadcast to all VVCs.  Examples:  enable\_log\_msg(SBI\_VVCT, 1, ID\_LOG\_BFM, “Enabling SBI BFM logging”);  enable\_log\_msg(UART\_VVCT, 1, TX, ID\_LOG\_BFM, “Enabling UART TX BFM logging”, NON\_QUIET, C\_SCOPE);  Broadcast:  enable\_log\_msg(VVC\_BROADCAST, ID\_LOG\_BFM, "Enabling BFM logging for all VVCs", NON\_QUIET, C\_SCOPE); |
| **flush\_command\_queue()** | **flush\_command\_queue(vvc\_target, vvc\_instance, msg, scope)**  **flush\_command\_queue(vvc\_target, vvc\_instance, vvc\_channel, msg, scope)**  Flushes the VVC command queue for the specified VVC target/channel. The procedure will log information with log ID ID\_IMMEDIATE\_CMD.  It is also available as a broadcast to all VVCs.  Example:  flush\_command\_queue(SBI\_VVCT, 1, “Flushing command queue”, C\_SCOPE);  Broadcast:  flush\_command\_queue(VVC\_BROADCAST, "Flushing command queues", C\_SCOPE); |
| **fetch\_result()** | **fetch\_result(vvc\_target, vvc\_instance, wanted\_id, result, msg, alert\_level, scope)**  **fetch\_result(vvc\_target, vvc\_instance, vvc\_channel, wanted\_id, result, msg, alert\_level, scope)**  **fetch\_result(vvc\_target, vvc\_instance, wanted\_id, result, fetch\_is\_accepted, msg, alert\_level, scope)**  **fetch\_result(vvc\_target, vvc\_instance, vvc\_channel, wanted\_id, result, fetch\_is\_accepted, msg, alert\_level, scope)**  Fetches a stored result using the command index. A result is stored when using e.g. the read or receive commands in a VVC. The fetched result is available on the ‘result’ output. The Boolean output ‘fetch\_is\_accepted’ is used to indicate if the fetch was successful or not. A fetch can fail if e.g. the wanted\_id did not have a result to store, or the wanted\_id read has not yet been executed. Omitting the ‘fetch\_is\_accepted’ parameter causes the parameters to be checked automatically in the procedure. On successful fetch, a message with log ID ID\_UVVM\_CMD\_RESULT is logged.  Example:  fetch\_result(SBI\_VVCT,1, v\_cmd\_idx, v\_data, v\_is\_ok, "Fetching read-result", C\_SCOPE);  Full example:  sbi\_read(SBI\_VVCT, 1, C\_ADDR\_FIFO\_GET, "Read from FIFO");  v\_cmd\_idx := get\_last\_received\_cmd\_idx(SBI\_VVCT,1); -- Retrieve the command index  await\_completion(SBI\_VVCT, 1, v\_cmd\_idx, 100 ns, "Wait for sbi\_read to finish");  fetch\_result(SBI\_VVCT, 1, v\_cmd\_idx, v\_data, v\_is\_ok, "Fetching read-result");  check\_value(v\_is\_ok, ERROR, "Readback OK via fetch\_result()"); |
| **insert\_delay()** | **insert\_delay(vvc\_target, vvc\_instance, delay, msg, scope)**  **insert\_delay(vvc\_target, vvc\_instance, vvc\_channel, delay, msg, scope)**  This method inserts a delay of ‘delay’ clock cycles or ‘delay’ seconds in the VVC.  It is also available as a broadcast to all VVCs.  Examples:  insert\_delay(SBI\_VVCT,1, 100, "100T delay", C\_SCOPE);  insert\_delay(SBI\_VVCT,1, 50 ns, "50 ns delay", C\_SCOPE);  Broadcast:  insert\_delay(VVC\_BROADCAST, 50 ns, "Insert 50 ns delay to all VVCs", C\_SCOPE); |
| **terminate\_current\_command()** | **terminate\_current\_command(vvc\_target, vvc\_instance, msg, scope)**  **terminate\_current\_command(vvc\_target, vvc\_instance, vvc\_channel, msg, scope)**  This method terminates the current command in the VVC, if the currently running BFM command supports the terminate signal.  It is also available as a broadcast to all VVCs.  Example:  terminate\_current\_command(SBI\_VVCT, 1, “Terminating current command”, C\_SCOPE);  Broadcast:  terminate\_current\_command(VVC\_BROADCAST, “Terminating current command in all VVCs”, C\_SCOPE); |
| **terminate\_all\_commands()** | **terminate\_all\_commands(vvc\_target, vvc\_instance, msg, scope)**  **terminate\_all\_commands(vvc\_target, vvc\_instance, vvc\_channel, msg, scope)**  This method terminates the current command in the VVC, if the currently running BFM command supports the terminate signal. The terminate\_all\_commands() procedure also flushes the VVC command queue, removing all pending commands.  It is also available as a broadcast to all VVCs.  Example:  terminate\_all\_commands(SBI\_VVCT, 1, “Terminating all commands”, C\_SCOPE);  Broadcast:  terminate\_all\_commands(VVC\_BROADCAST,”Terminating all commands in all VVCs”, C\_SCOPE); |
| **get\_last\_received\_cmd\_idx()** | **get\_last\_received\_cmd\_idx(vvc\_target, vvc\_instance, scope)**  **get\_last\_received\_cmd\_idx(vvc\_target, vvc\_instance, vvc\_channel, scope)**  This method is used to get the command index of the last command received by the VVC interpreter. Necessary for getting the command index of a read for fetch\_result.  Example:  v\_cmd\_idx := get\_last\_received\_cmd\_idx(SBI\_VVCT, 1, C\_SCOPE); |

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