

# **OSVVM Settings**

# **User Guide**

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## 1 OSVVM Settings Overview

OSVVM supports VHDL settings in `OsvvmScriptSettingsPkg_generated.vhd` and `OsvvmSettingsPkg_default.vhd`, and script settings in `OsvvmSettingsLocal.tcl`.

The default OSVVM settings are intended to be the best settings for new users of OSVVM. So, if you are just getting started with OSVVM, you can skip reading this document for now.

## 2 OsvvmScriptSettingsPkg

`OsvvmScriptSettingsPkg` is used to help the VHDL code locate items set by the scripts. It uses deferred constants defined in the file `OsvvmScriptSettingsPkg.vhd` and given a value in the package body generated as `OsvvmScriptSettingsPkg_generated.vhd`.

### 2.1 OsvvmScriptSettingsPkg\_generated.vhd

```
-- This file is autogenerated by CreateOsvvmScriptSettingsPkg
package body OsvvmScriptSettingsPkg is
    constant OSVVM_HOME_DIRECTORY      : string := "C:/OsvvmLibraries" ;
    constant OSVVM_RAW_OUTPUT_DIRECTORY : string := "" ;
    constant OSVVM_BASE_OUTPUT_DIRECTORY : string := "" ;
    constant OSVVM_BUILD_YAML_FILE      : string := "OsvvmRun.yml" ;
    constant OSVVM_TRANSCRIPT_YAML_FILE : string := "OSVVM_transcript.yml" ;
    constant OSVVM_REVISION              : string := "2024.09" ;
    constant OSVVM_SETTINGS_REVISION    : string := "2024.09" ;
end package body OsvvmScriptSettingsPkg ;
```

### 2.2 Location of OsvvmScriptSettingsPkg\_generated.vhd

The package `OsvvmScriptSettingsPkg_generated.vhd` is generated by the OSVVM scripts. It is created in either `OsvvmLibraries/Scripts/$OsvvmSettingsSubDirectory` or `$CurrentSimulationDirectory/$OsvvmSettingsSubDirectory` depending on the setting of TCL variable `SettingsAreRelativeToSimulationDirectory`.

If `OsvvmScriptSettingsPkg_local.vhd` exists, it will be analyzed, otherwise, if `OsvvmScriptSettingsPkg_generated.vhd` exists, it will be analyzed, otherwise, `OsvvmScriptSettingsPkg_default.vhd` will be analyzed.

### 3 OsvvmSettingsPkg

OsvvmSettingsPkg is used to support backward compatibility, while moving the community forward to new recommended settings.

#### 3.1 Package Body and Interface Groups

OsvvmSettingsPkg\_default.vhd is a package body that sets deferred constants. It is organized as follows.

```
use work.IfElsePkg.all ;
use work.OsvvmScriptSettingsPkg.all ;

package body OsvvmSettingsPkg is
  -- Settings for RandomPkg
  -- Settings for ScoreboardGenericPkg
  -- Settings shared by AlertLogPkg and CoveragePkg
  -- Settings for CoveragePkg
  -- Settings for AlertLogPkg
end package body OsvvmSettingsPkg ;
```

#### 3.2 Settings for RandomPkg

```
constant RANDOM_USE_NEW_SEED_METHODS : boolean :=
  IfElse(OSVVM_SETTINGS_REVISION >= "2024", TRUE, FALSE) ; -- Historic FALSE
```

RANDOM\_USE\_NEW\_SEED\_METHODS selects higher quality seed generation methods in InitSeed. Make it TRUE for new designs. Keep it FALSE for older test cases that use OSVVM randomization.

#### 3.3 Settings for ScoreboardGenericPkg

```
constant SCOREBOARD_YAML_IS_BASE_FILE_NAME : boolean :=
  IfElse(OSVVM_SETTINGS_REVISION >= "2024", TRUE, FALSE) ; -- Historic FALSE
```

WriteScoreboardYaml is used when creating a custom scoreboard instance. Setting SCOREBOARD\_YAML\_IS\_BASE\_FILE\_NAME to TRUE allows a short name to be used with WriteScoreboardYaml, otherwise, a name of an exact format must be used.

#### 3.4 Shared Settings for AlertLogPkg and CoveragePkg

These determine the names printed by output generated by AlertLogPkg and CoveragePkg.

```
constant OSVVM_PRINT_PREFIX      : string := "% " ;
constant OSVVM_DONE_NAME         : string := "DONE" ;
```

```

constant OSVVM_PASS_NAME          : string := "PASSED" ;
constant OSVVM_FAIL_NAME          : string := "FAILED" ;
constant OSVVM_DEFAULT_TIME_UNITS : time  := 1 ns ;

```

### 3.5 Settings for CoveragePkg

COVERAGE\_DEFAULT\_WEIGHT\_MODE sets the default weight mode for coverage randomization.

```

constant COVERAGE_DEFAULT_WEIGHT_MODE : string :=
  IfElse(OSVVM_SETTINGS_REVISION >= "2024", string'("REMAIN"), "AT_LEAST") ;

```

COVERAGE\_USE\_NEW\_SEED\_METHODS is like RANDOM\_USE\_NEW\_SEED\_METHODS for the coverage package.

```

constant COVERAGE_USE_NEW_SEED_METHODS : boolean := TRUE ;

```

The following are used for names printed in coverage reports.

```

constant COVERAGE_PRINT_PREFIX      : string := OSVVM_PRINT_PREFIX ;
constant COVERAGE_PASS_NAME         : string := OSVVM_PASS_NAME ;
constant COVERAGE_FAIL_NAME         : string := OSVVM_FAIL_NAME ;

```

The following are default settings used in the WriteBin reports. These are not relevant for the HTML reports.

```

constant COVERAGE_WRITE_PASS_FAIL   : boolean := FALSE ;
constant COVERAGE_WRITE_BIN_INFO     : boolean := TRUE ;
constant COVERAGE_WRITE_COUNT        : boolean := TRUE ;
constant COVERAGE_WRITE_ANY_ILLEGAL : boolean := FALSE ;

```

### 3.6 Settings for AlertLogPkg

The following controls specify that Alerts and Logs are to be printed justified with time first and time is justified by 9.

```

constant ALERT_LOG_JUSTIFY_ENABLE : boolean :=
  IfElse(OSVVM_SETTINGS_REVISION >= "2024", TRUE, FALSE) ; -- Historic FALSE
constant ALERT_LOG_WRITE_TIME_FIRST : boolean :=
  IfElse(OSVVM_SETTINGS_REVISION >= "2024", TRUE, FALSE) ; -- Historic FALSE
constant ALERT_LOG_WRITE_TIME_LAST : boolean := not ALERT_LOG_WRITE_TIME_FIRST ;
constant ALERT_LOG_TIME_JUSTIFY_AMOUNT : integer :=
  IfElse(OSVVM_SETTINGS_REVISION >= "2024", 9, 0) ; -- Justify time

```

The following controls defaults for AffirmIfFilesMatch and AlertIfFilesNotMatch.

```

constant ALERT_LOG_IGNORE_SPACES : boolean := FALSE ; -- Historic FALSE
constant ALERT_LOG_IGNORE_EMPTY_LINES : boolean := FALSE ; -- Historic FALSE

```

The following controls defaults for printing Alerts and Logs.

```

-- prefix message with # of errors - requested by Marco for Mike P.

```

```

constant ALERT_LOG_WRITE_ERRORCOUNT : boolean := FALSE ;
constant ALERT_LOG_WRITE_NAME        : boolean := TRUE ;   -- Print name Alert/Log
constant ALERT_LOG_WRITE_LEVEL       : boolean := TRUE ;   -- Print Level Name
constant ALERT_LOG_WRITE_TIME        : boolean := TRUE ;   -- Print Time
constant ALERT_LOG_ALERT_NAME        : string := "Alert" ;
constant ALERT_LOG_LOG_NAME          : string := "Log " ;
constant ALERT_LOG_ID_SEPARATOR      : string := ": " ;
constant ALERT_LOG_PRINT_PREFIX      : string := OSVVM_PRINT_PREFIX ;
constant ALERT_LOG_DONE_NAME         : string := OSVVM_DONE_NAME ;
constant ALERT_LOG_PASS_NAME         : string := OSVVM_PASS_NAME ;
constant ALERT_LOG_FAIL_NAME         : string := OSVVM_FAIL_NAME ;
constant ALERT_LOG_NOCHECKS_NAME     : string := "NOCHECKS" ;
constant ALERT_LOG_TIMEOUT_NAME      : string := "TIMEOUT" ;

```

### Default stop counts for Alert FAILURE, ERROR, and WARNING.

```

constant ALERT_LOG_STOP_COUNT_FAILURE : integer := 0 ;
constant ALERT_LOG_STOP_COUNT_ERROR   : integer := integer'high ;
constant ALERT_LOG_STOP_COUNT_WARNING : integer := integer'high ;

```

### Default stop counts for Alert FAILURE, ERROR, and WARNING.

```

constant ALERT_LOG_GLOBAL_ALERT_ENABLE : boolean := TRUE ;

```

### Default for requirements goals.

```

constant ALERT_LOG_DEFAULT_PASSED_GOAL : integer := 1 ;

```

### Control what makes a test failure. Recommendation set all to TRUE.

```

constant ALERT_LOG_FAIL_ON_WARNING      : boolean := TRUE ;
constant ALERT_LOG_FAIL_ON_DISABLED_ERRORS : boolean := TRUE ;
constant ALERT_LOG_FAIL_ON_REQUIREMENT_ERRORS : boolean := TRUE ;

```

### The following controls defaults for printing with ReportAlerts.

```

constant ALERT_LOG_REPORT_HIERARCHY      : boolean := TRUE ;
constant ALERT_LOG_PRINT_PASSED          : boolean := TRUE ;
constant ALERT_LOG_PRINT_AFFIRMATIONS    : boolean := FALSE ;
constant ALERT_LOG_PRINT_DISABLED_ALERTS : boolean := FALSE ;
constant ALERT_LOG_PRINT_REQUIREMENTS    : boolean := FALSE ;
constant ALERT_LOG_PRINT_IF_HAVE_REQUIREMENTS : boolean := TRUE ;

```

## 4 Variables Set by Simulator Scripts

The following tcl variables are set by VendorScripts\_<ScriptBaseName>.tcl. Where ScriptBaseName is a tcl variable that uniquely identifies the tool being run.

```
# variable ToolVendor
# variable ToolName
# variable ToolVersion
# variable ToolNameVersion
# variable ToolArgs
# variable NoGui
# variable ToolSupportsGenericPackages
# variable ToolType
```

## 5 OsvvmSettingsLocal

OsvvmSettingsLocal.tcl is used to configure script settings. A template is provided in the OsvvmSettingsLocal\_Example.tcl in directory OsvvmLibraries/Scripts. See the next section Settings Directory for where you should put OsvvmSettingsLocal.tcl.

### 5.1 Structure of OsvvmSettingsLocal.tcl

```
# Global Settings
namespace eval ::osvmm {
# OSVVM Name Space Settings
# Version Compatibility Settings
# Directory structure and results file management
# TCL Error signaling during a build
# Stop Counts for Failures seen by Analyze and Simulate
# Generate transcripts
# VHDL Simulation Settings
# Default Coverage Options
# Simulation Controls
# Extended Analyze and Simulate Options
# GHDL Analyze and Simulate Options
# Second Top
}
```

### 5.2 Global Settings

Set variables to your project variables here.

```
variable Proj1 C:/Dev/Proj1
```

This will allow you to build your project as:

```
build $Proj1/build.pro
```

## 5.3 Version Compatibility Settings

Version compatibility allows OSVVM's settings to work like previous versions.

```
variable OsvvmVersionCompatibility $OsvvmVersion ;# 2023.00
```

Generate failure on status NOCHECKS (when 1), otherwise, passed.

```
variable FailOnNoChecks 1 ;# 0 ;# false
```

Use the old version of CreateClock and CreateReset procedures.

```
variable ClockResetVersion $OsvvmVersion ;# 2023.00
```

## 5.4 Directory Structure and Results File Management

Base directory to contain other outputs.

```
variable OutputBaseDirectory "" ;# "osvvm"
```

Subdirectories of the base directory.

```
variable LogSubdirectory "logs" ;# logs in $OutputBaseDirectory/logs
variable ReportsSubdirectory "reports" ;# reports in $OutputBaseDirectory/reports
variable ResultsSubdirectory "results" ;# results in $OutputBaseDirectory/results
variable CoverageSubdirectory "CodeCoverage" ;# Code Coverage in . . .
```

Formulation of Library Directory

```
# Library Directory = [file join $VhdlLibraryParentDirectory \
# $OutputBaseDirectory $VhdlLibraryDirectory $VhdlLibrarySubdirectory]
variable VhdlLibraryParentDirectory "" ;# "C:/tools"
variable VhdlLibraryDirectory "VHDL_LIBS"
variable VhdlLibrarySubdirectory "${ToolNameVersion}" ;# default value
```

Directory to hold temporary files. Typically same as OutputBaseDirectory.

```
variable OsvvmTemporaryOutputDirectory "" ;# temporary files
```

## 5.5 Supporting Different VHDL Settings for Different Simulators

Setting OsvvmSettingsSubDirectory adds a subdirectory to the search path or generated file path for VHDL settings. For details see [Settings Directory](#). A good setting for supporting multiple simulators is:

```
variable OsvvmSettingsSubDirectory $ToolName
```

If multiple simulators are not being used, the default value of "" is just fine.



## 5.6 Supporting Different Script Settings for Different Simulators

OsvvmSettingsSubDirectory cannot be used to select a simulator specific version of OsvvmSettingsLocal.tcl since OsvvmSettingsLocal.tcl sets OsvvmSettingsSubDirectory – a chicken and egg problem.

Instead, in addition to running OsvvmSettingsLocal.tcl (if it exists), StartUpShared.tcl will also run OsvvmSettingsLocal\_<ScriptBaseName>.tcl (if it exists).

If different naming than <ScriptBaseName> is needed, then OsvvmSettingsLocal.tcl can include something like the following to run simulator specific settings:

```
include OsvvmSettingsLocal_${ToolName}.tcl
```

Small customizations can be added to OsvvmSettingsLocal.tcl using conditionals such as the following:

```
if {($ToolVendor eq "Siemens") || ($ToolVendor eq "Aldec")} {  
    variable ExtendedAnalyzeOptions    "-quiet"  
    variable ExtendedSimulateOptions    "-quiet"  
}
```

## 5.7 What Should Generate TCL Errors

```
variable FailOnBuildErrors    "true"  
variable FailOnReportErrors    "false"  
variable FailOnTestCaseErrors "false"
```

## 5.8 Stop Build on Number of Analyze and Simulate Errors

Stop build when AnalyzeErrorStopCount and SimulteErrorStopCount errors have occurred. If the value is 0, then do not stop. Do not stop is appropriate for regression runs.

```
variable AnalyzeErrorStopCount    0  
variable SimulateErrorStopCount    0
```

## 5.9 Type of Transcripts to Generate

Generate HTML Transcript

```
variable TranscriptExtension    "html"    ;# Generate log and html transcripts
```

Generate Simulation Script for entire run

```
variable CreateSimScripts    "false"    ;# Create a simulator script
```

Generate Log file with just OSVVM Output

```
variable CreateOsvvmOutput    "false"    ;# log file with just OSVVM output
```

## 5.10 VHDL Simulation Settings

```
# Valid VHDL Version values 1993, 2002, 2008, 2019
variable DefaultVHDLVersion    "2008" ; # OSVVM requires >= 2008.
variable SimulateTimeUnits     "ps"
variable DefaultLibraryName    "DefaultLib"
```

## 5.11 Default Coverage Options

```
variable CoverageEnable        "true"
variable CoverageAnalyzeEnable "false"
variable CoverageSimulateEnable "false"
variable CoverageAnalyzeOptions [vendor_SetCoverageAnalyzeDefaults]
variable CoverageSimulateOptions [vendor_SetCoverageSimulateDefaults]
```

## 5.12 Default Simulation Controls

```
variable SimulateInteractive "false"
variable DebugIsSet          "false"
variable Debug                "false"
variable LogSignalsIsSet     "false"
variable LogSignals           "false"
variable ScriptDebug         "false"
```

## 5.13 Extended Analyze and Simulate Options

```
variable VhdlAnalyzeOptions    ""
variable VerilogAnalyzeOptions ""
variable ExtendedAnalyzeOptions "" ;# "-quiet"
variable ExtendedSimulateOptions "" ;# "-quiet"
```

## 5.14 GHDL and NVC Analyze and Simulate Options

```
variable ExtendedElaborateOptions ""
variable ExtendedRunOptions        ""
variable SaveWaves                 "false"
variable SimulateInteractive       "false"
```

## 5.15 Name of Second Top Level

```
variable SecondSimulationTopLevel ""
```

## 5.16 Deprecated Settings

The setting `SettingsAreRelativeToSimulationDirectory` is deprecated and the only valid value is "false". The value will be "false" in `StartUpShared`, since `OsvvmSettingsLocal.tcl` has not run yet. As a result, if set to "true", VHDL settings will be in a different directory from the script settings. In a future revision of OSVVM, it is likely that setting this to "true" will result in a tcl error.

## 6 Directory for VHDL and Script Settings

VHDL and Script settings are found in the directory specified by joining the variables \$SettingsRootDirectory, \$SettingsDirectory, and \$::osvwm::OsvwmSettingsSubDirectory.

The SettingsRootDirectory is \$OsvvmLibraries. \$OsvvmLibraries is the location of your OsvvmLibraries install. \$OsvvmLibraries is a tcl variable set by the scripts when started with \$OsvvmLibraries/Scripts/StartUp.tcl.

The SettingsDirectory is determined by the first of the following found:

- Environment variable OSVVM\_SETTINGS\_DIR - (highest precedence)
- Directory \$OsvvmLibraries/./OsvvmSettings
- Directory \$OsvvmLibraries/osvwm for vhdL settings and \$OsvvmLibraries/Scripts for script settings - (lowest precedence)

The OSVVM\_SETTINGS\_DIR variable can contain either an absolute path or a relative path. If OSVVM\_SETTINGS\_DIR contains an absolute path, then the path of \$OsvvmLibraries in the join is ignored.

\$::osvwm::OsvwmSettingsSubDirectory is set by OsvwmSettingsLocal.tcl. As a result, this value is "" for scripts (since OsvwmSettingsLocal.tcl has not been called yet). If multiple simulators are being used, set OsvwmSettingsSubDirectory as follows:

```
set OsvwmSettingsSubDirectory ${ToolName}
```

## 7 About the Author - Jim Lewis

Jim Lewis, the founder of SynthWorks, has thirty plus years of design, teaching, and problem solving experience. In addition to working as a Principal Trainer for SynthWorks, Mr Lewis has done ASIC and FPGA design, custom model development, and consulting.

Mr. Lewis is chair of the IEEE 1076 VHDL Working Group (VASG) and is the primary developer of the Open Source VHDL Verification Methodology (OSVVM.org) packages. Neither of these activities generate revenue.

Please support our volunteer efforts by buying your VHDL training from SynthWorks.

If you find bugs these packages or would like to request enhancements, you can reach me at [jim@synthworks.com](mailto:jim@synthworks.com).