

WREB Test

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Chapter 1

WREB Testing Suite

This is the testing suite for the WREB CCD interface, designed to verify that the WREB boards are defect-free and operating as expected. Note that this program communicates directly with the Jython interpreter to manipulate the board, so it does not need to be loaded into the Jython executor and can be run directly from the terminal with python.

Tests are structured as classes with four required methods:

- **init** sets initial variables; minimum required variables are self.title and self.status.
- **runTest** is the body of the tests, running the code to execute the tests and storing the results to state variables.
- **summarize** writes summary information to the summary object passed to it; this is used in generating the cover page.
- **report** writes the portion of the pdf report that the test is responsible for.

External dependencies

All external dependencies are contained within Anaconda:

- astropy
- numpy
- matplotlib

Running the testing suite

- Ensure Jython console is running (./JythonConsole or the bootstrapper program)
- Ensure crRun.sh is running
- Ensure DACs are loaded in the CCS console
- "python WREBTest.py [options]" Initial crashing yielding a ValueError is likely due to a crRun or JythonConsole crashing or not being loaded.

Chapter 2

Hierarchical Index

2.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

CcsJythonInterpreter	
WREBTest.JythonInterface	19
object	
WREBTest.ASPICcommsTest	9
WREBTest.ASPICNoise	10
WREBTest.ChannelTest	11
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Chapter 3

Class Index

3.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

WREBTest.ASPICcommsTest	9
Tests that the board can communicate with the ASPICS	
WREBTest.ASPICNoise	10
Measure noise distribution in ASPICs for the unclamped, clamped, and reset cases	
WREBTest.ChannelTest	11
Tests number of communicable channels available to the board	
WREBTest.CSGate	13
Tests the current source gate	
WREBTest.FunctionalTest	14
Runs the functional testing suite	
WREBTest.GDBias	15
Tests the guard drain performance	
WREBTest.GUI	16
Dialog-based GUI for displaying test progress and navigating options	
WREBTest.IdleCurrentConsumption	17
Test for idle current consumption in the WREB board	
WREBTest.JythonInterface	19
Some hacky workarounds to clean up the limited communication with the Jython interface	
WREBTest.ODBias	20
Tests the output drain performance	
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Tests the output gate performance	
WREBTest.PCKRails	22
Test the parallel clock rail performance	
WREBTest.PDFGen.PDF	24
PDF generation class for reports	
WREBTest.RDBias	27
Tests the reset drain performance	
WREBTest.RGRails	29
Tests the reset gate rail performance	
WREBTest.RGRailsDiverging	30
Tests the reset gate rail performance with a diverging voltage pattern	
WREBTest.SCKRails	32
Tests the serial clock rail performance	
WREBTest.SCKRailsDiverging	33
Test the serial clock rail performance with a diverging voltage pattern	

WREBTest.Summary	
Summary object containing the needed information for the cover page	34
WREBTest.TemperatureLogging	
Requests temperature logs for WREB.Temp(1-6) and CCD since the test started from the board's database	35

Chapter 4

File Index

4.1 File List

Here is a list of all documented files with brief descriptions:

WREBTest.py	
Suite of tests for the WREB controller board	37
WREBTestPDFGen.py	
Contains common PDF generation routines for the WREB test report	40

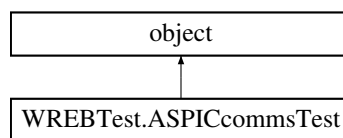
Chapter 5

Class Documentation

5.1 WREBTest.ASPICcommsTest Class Reference

Tests that the board can communicate with the ASPICS.

Inheritance diagram for WREBTest.ASPICcommsTest:



Public Member Functions

- def `__init__` (self)
Initialize minimum required variables for test list.
- def `runTest` (self)
Run the test, save output to state variables.
- def `summarize` (self, summary)
Summarize the test results for the cover page of the report.
- def `report` (self, pdf)
generate this test's page in the PDF report.

5.1.1 Detailed Description

Tests that the board can communicate with the ASPICS.

5.1.2 Constructor & Destructor Documentation

5.1.2.1 def WREBTest.ASPICcommsTest.__init__(self)

Initialize minimum required variables for test list.

5.1.3 Member Function Documentation

5.1.3.1 def WREBTest.ASPICcommsTest.report(self, pdf)

generate this test's page in the PDF report.

Parameters

<i>pdf</i>	pyfpdf-compatible PDF object.
------------	-------------------------------

5.1.3.2 `def WREBTest.ASPICcommsTest.runTest (self)`

Run the test, save output to state variables.

5.1.3.3 `def WREBTest.ASPICcommsTest.summarize (self, summary)`

Summarize the test results for the cover page of the report.

Parameters

<i>summary</i>	Summary object passed from FunctionalTest()
----------------	---

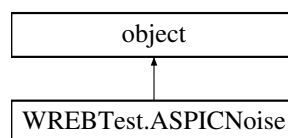
The documentation for this class was generated from the following file:

- [WREBTest.py](#)

5.2 WREBTest.ASPICNoise Class Reference

Measure noise distribution in ASPICs for the unclamped, clamped, and reset cases.

Inheritance diagram for WREBTest.ASPICNoise:



Public Member Functions

- `def __init__ (self)`
Initialize minimum required variables for test list.
- `def runTest (self)`
Run the test, save output to state variables.
- `def summarize (self, summary)`
Summarize the test results for the cover page of the report.
- `def report (self, pdf)`
generate this test's page in the PDF report.

5.2.1 Detailed Description

Measure noise distribution in ASPICs for the unclamped, clamped, and reset cases.

5.2.2 Constructor & Destructor Documentation

5.2.2.1 `def WREBTest.ASPICNoise.__init__(self)`

Initialize minimum required variables for test list.

5.2.3 Member Function Documentation

5.2.3.1 `def WREBTest.ASPICNoise.report(self, pdf)`

generate this test's page in the PDF report.

Parameters

<i>pdf</i>	pyfpdf-compatible PDF object.
------------	-------------------------------

5.2.3.2 `def WREBTest.ASPICNoise.runTest(self)`

Run the test, save output to state variables.

5.2.3.3 `def WREBTest.ASPICNoise.summarize(self, summary)`

Summarize the test results for the cover page of the report.

Parameters

<i>summary</i>	Summary object passed from FunctionalTest()
----------------	---

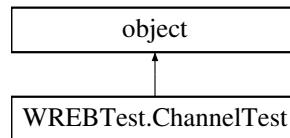
The documentation for this class was generated from the following file:

- [WREBTest.py](#)

5.3 WREBTest.ChannelTest Class Reference

Tests number of communicable channels available to the board.

Inheritance diagram for WREBTest.ChannelTest:



Public Member Functions

- `def __init__ (self)`
Initialize minimum required variables for test list.
- `def runTest (self)`
Run the test, save output to state variables.
- `def summarize (self, summary)`
Summarize the test results for the cover page of the report.
- `def report (self, pdf)`
generate this test's page in the PDF report.

5.3.1 Detailed Description

Tests number of communicable channels available to the board.

5.3.2 Constructor & Destructor Documentation

5.3.2.1 `def WREBTest.ChannelTest.__init__ (self)`

Initialize minimum required variables for test list.

5.3.3 Member Function Documentation

5.3.3.1 `def WREBTest.ChannelTest.report (self, pdf)`

generate this test's page in the PDF report.

Parameters

<i>pdf</i>	pyfpdf-compatible PDF object.
------------	-------------------------------

5.3.3.2 `def WREBTest.ChannelTest.runTest (self)`

Run the test, save output to state variables.

5.3.3.3 `def WREBTest.ChannelTest.summarize (self, summary)`

Summarize the test results for the cover page of the report.

Parameters

<i>summary</i>	Summary object passed from FunctionalTest()
----------------	---

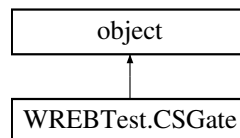
The documentation for this class was generated from the following file:

- [WREBTest.py](#)

5.4 WREBTest.CSGate Class Reference

Tests the current source gate.

Inheritance diagram for WREBTest.CSGate:



Public Member Functions

- def [__init__](#) (self)
Initialize minimum required variables for test list.
- def [runTest](#) (self)
Run the test, save output to state variables.
- def [summarize](#) (self, summary)
Summarize the test results for the cover page of the report.
- def [report](#) (self, pdf)
generate this test's page in the PDF report.

5.4.1 Detailed Description

Tests the current source gate.

5.4.2 Constructor & Destructor Documentation

5.4.2.1 def WREBTest.CSGate.__init__ (self)

Initialize minimum required variables for test list.

5.4.3 Member Function Documentation

5.4.3.1 def WREBTest.CSGate.report (self, pdf)

generate this test's page in the PDF report.

Parameters

<i>pdf</i>	pyfpdf-compatible PDF object.
------------	-------------------------------

5.4.3.2 def WREBTest.CSGate.runTest (self)

Run the test, save output to state variables.

5.4.3.3 def WREBTest.CSGate.summarize (self, summary)

Summarize the test results for the cover page of the report.

Parameters

<i>summary</i>	Summary object passed from FunctionalTest()
----------------	---

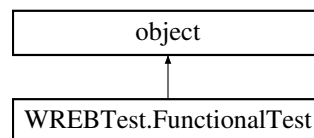
The documentation for this class was generated from the following file:

- [WREBTest.py](#)

5.5 WREBTest.FunctionalTest Class Reference

Runs the functional testing suite.

Inheritance diagram for WREBTest.FunctionalTest:



Public Member Functions

- def [__init__](#) (self)
Initializes the board information and list of tests to be run.
- def [runTests](#) (self)
Run the tests.
- def [generateReport](#) (self)
Generate a pyfpdf-compatible PDF report from the test data.

5.5.1 Detailed Description

Runs the functional testing suite.

5.5.2 Constructor & Destructor Documentation

5.5.2.1 def WREBTest.FunctionalTest.__init__(self)

Initializes the board information and list of tests to be run.

5.5.3 Member Function Documentation

5.5.3.1 def WREBTest.FunctionalTest.generateReport (self)

Generate a pyfpdf-compatible PDF report from the test data.

5.5.3.2 def WREBTest.FunctionalTest.runTests (self)

Run the tests.

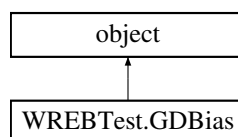
The documentation for this class was generated from the following file:

- [WREBTest.py](#)

5.6 WREBTest.GDBias Class Reference

Tests the guard drain performance.

Inheritance diagram for WREBTest.GDBias:



Public Member Functions

- def [__init__](#) (self)
Initialize minimum required variables for test list.
- def [runTest](#) (self)
Run the test, save output to state variables.
- def [summarize](#) (self, summary)
Summarize the test results for the cover page of the report.
- def [report](#) (self, pdf)
generate this test's page in the PDF report.

5.6.1 Detailed Description

Tests the guard drain performance.

5.6.2 Constructor & Destructor Documentation

5.6.2.1 `def WREBTest.GDBias.__init__(self)`

Initialize minimum required variables for test list.

5.6.3 Member Function Documentation

5.6.3.1 `def WREBTest.GDBias.report(self, pdf)`

generate this test's page in the PDF report.

Parameters

<i>pdf</i>	pyfpdf-compatible PDF object.
------------	-------------------------------

5.6.3.2 `def WREBTest.GDBias.runTest(self)`

Run the test, save output to state variables.

5.6.3.3 `def WREBTest.GDBias.summarize(self, summary)`

Summarize the test results for the cover page of the report.

Parameters

<i>summary</i>	Summary object passed from FunctionalTest()
----------------	---

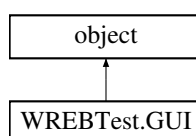
The documentation for this class was generated from the following file:

- [WREBTest.py](#)

5.7 WREBTest.GUI Class Reference

Dialog-based [GUI](#) for displaying test progress and navigating options.

Inheritance diagram for WREBTest.GUI:



Public Member Functions

- def `__init__` (self)
Start the dialog.
- def `update` (self, fnTest, generatingPDF=False)
Update the [GUI](#) to display current testing progress.
- def `updateContinuously` (self, fnTest)
Continuously update the display every `_` seconds.

5.7.1 Detailed Description

Dialog-based [GUI](#) for displaying test progress and navigating options.

5.7.2 Constructor & Destructor Documentation

5.7.2.1 def WREBTest.GUI.__init__ (self)

Start the dialog.

5.7.3 Member Function Documentation

5.7.3.1 def WREBTest.GUI.update (self, fnTest, generatingPDF=False)

Update the [GUI](#) to display current testing progress.

5.7.3.2 def WREBTest.GUI.updateContinuously (self, fnTest)

Continuously update the display every `_` seconds.

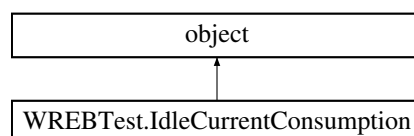
The documentation for this class was generated from the following file:

- [WREBTest.py](#)

5.8 WREBTest.IdleCurrentConsumption Class Reference

Test for idle current consumption in the WREB board.

Inheritance diagram for WREBTest.IdleCurrentConsumption:



Public Member Functions

- def `__init__` (self)
Initialize minimum required variables for test list.
- def `runTest` (self)
Run the test, save output to state variables.
- def `summarize` (self, summary)
Summarize the test results for the cover page of the report.
- def `report` (self, pdf)
generate this test's page in the PDF report.

5.8.1 Detailed Description

Test for idle current consumption in the WREB board.

5.8.2 Constructor & Destructor Documentation

5.8.2.1 `def WREBTest.IdleCurrentConsumption.__init__ (self)`

Initialize minimum required variables for test list.

5.8.3 Member Function Documentation

5.8.3.1 `def WREBTest.IdleCurrentConsumption.report (self, pdf)`

generate this test's page in the PDF report.

Parameters

<i>pdf</i>	pyfpdf-compatible PDF object.
------------	-------------------------------

5.8.3.2 `def WREBTest.IdleCurrentConsumption.runTest (self)`

Run the test, save output to state variables.

5.8.3.3 `def WREBTest.IdleCurrentConsumption.summarize (self, summary)`

Summarize the test results for the cover page of the report.

Parameters

<i>summary</i>	<code>Summary</code> object passed from <code>FunctionalTest()</code>
----------------	---

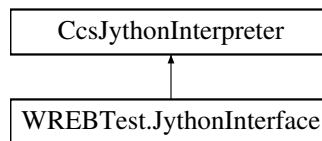
The documentation for this class was generated from the following file:

- [WREBTest.py](#)

5.9 WREBTest.JythonInterface Class Reference

Some hacky workarounds to clean up the limited communication with the Jython interface.

Inheritance diagram for WREBTest.JythonInterface:



Public Member Functions

- def `do` (self, code)
Execute a command on the CCS Jython interpreter.
- def `get` (self, code, dtype="float")
Executes a piece of code and returns the value through getOutput().

5.9.1 Detailed Description

Some hacky workarounds to clean up the limited communication with the Jython interface.

5.9.2 Member Function Documentation

5.9.2.1 def WREBTest.JythonInterface.do (self, code)

Execute a command on the CCS Jython interpreter.

Parameters

<code>code</code>	Code as a literal to be executed.
-------------------	-----------------------------------

5.9.2.2 def WREBTest.JythonInterface.get (self, code, dtype = "float")

Executes a piece of code and returns the value through getOutput().

Parameters

<code>code</code>	Code as a literal to be executed.
<code>dtype</code>	Optional data type, defaults to float.

Returns

Converted value received through printed output from `getOutput()`. `getOutput()` normally only returns the results of `cout`, so the result is automatically typecasted to type `dtype`. This should be used only with a single command at a time. Like I said, hacky work around, this should be fixed in the future.

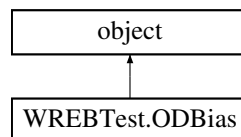
The documentation for this class was generated from the following file:

- [WREBTest.py](#)

5.10 WREBTest.ODBias Class Reference

Tests the output drain performance.

Inheritance diagram for WREBTest.ODBias:

**Public Member Functions**

- `def __init__ (self)`
Initialize minimum required variables for test list.
- `def runTest (self)`
Run the test, save output to state variables.
- `def summarize (self, summary)`
Summarize the test results for the cover page of the report.
- `def report (self, pdf)`
generate this test's page in the PDF report.

5.10.1 Detailed Description

Tests the output drain performance.

5.10.2 Constructor & Destructor Documentation**5.10.2.1 `def WREBTest.ODBias.__init__ (self)`**

Initialize minimum required variables for test list.

5.10.3 Member Function Documentation**5.10.3.1 `def WREBTest.ODBias.report (self, pdf)`**

generate this test's page in the PDF report.

Parameters

<i>pdf</i>	pyfpdf-compatible PDF object.
------------	-------------------------------

5.10.3.2 def WREBTest.OGBias.runTest (self)

Run the test, save output to state variables.

5.10.3.3 def WREBTest.OGBias.summarize (self, summary)

Summarize the test results for the cover page of the report.

Parameters

<i>summary</i>	Summary object passed from FunctionalTest()
----------------	---

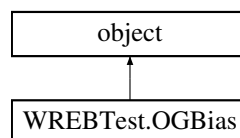
The documentation for this class was generated from the following file:

- [WREBTest.py](#)

5.11 WREBTest.OGBias Class Reference

Tests the output gate performance.

Inheritance diagram for WREBTest.OGBias:



Public Member Functions

- def [__init__](#) (self)
Initialize minimum required variables for test list.
- def [runTest](#) (self)
Run the test, save output to state variables.
- def [summarize](#) (self, summary)
Summarize the test results for the cover page of the report.
- def [report](#) (self, pdf)
generate this test's page in the PDF report.

5.11.1 Detailed Description

Tests the output gate performance.

The real OG test.

5.11.2 Constructor & Destructor Documentation

5.11.2.1 `def WREBTest.OGBias.__init__(self)`

Initialize minimum required variables for test list.

5.11.3 Member Function Documentation

5.11.3.1 `def WREBTest.OGBias.report(self, pdf)`

generate this test's page in the PDF report.

Parameters

<i>pdf</i>	pyfpdf-compatible PDF object.
------------	-------------------------------

5.11.3.2 `def WREBTest.OGBias.runTest(self)`

Run the test, save output to state variables.

5.11.3.3 `def WREBTest.OGBias.summarize(self, summary)`

Summarize the test results for the cover page of the report.

Parameters

<i>summary</i>	Summary object passed from FunctionalTest()
----------------	---

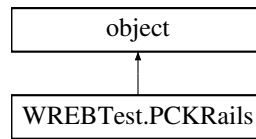
The documentation for this class was generated from the following file:

- [WREBTest.py](#)

5.12 WREBTest.PCKRails Class Reference

Test the parallel clock rail performance.

Inheritance diagram for WREBTest.PCKRails:



Public Member Functions

- def `__init__` (self)
Initialize minimum required variables for test list.
- def `runTest` (self)
Run the test, save output to state variables.
- def `summarize` (self, summary)
Summarize the test results for the cover page of the report.
- def `report` (self, pdf)
generate this test's page in the PDF report.

5.12.1 Detailed Description

Test the parallel clock rail performance.

5.12.2 Constructor & Destructor Documentation

5.12.2.1 def WREBTest.PCKRails.__init__ (self)

Initialize minimum required variables for test list.

5.12.3 Member Function Documentation

5.12.3.1 def WREBTest.PCKRails.report (self, pdf)

generate this test's page in the PDF report.

Parameters

<i>pdf</i>	pyfpdf-compatible PDF object.
------------	-------------------------------

5.12.3.2 def WREBTest.PCKRails.runTest (self)

Run the test, save output to state variables.

5.12.3.3 def WREBTest.PCKRails.summarize (self, summary)

Summarize the test results for the cover page of the report.

Parameters

<i>summary</i>	Summary object passed from FunctionalTest()
----------------	---

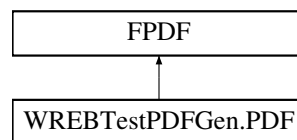
The documentation for this class was generated from the following file:

- [WREBTest.py](#)

5.13 WREBTestPDFGen.PDF Class Reference

[PDF](#) generation class for reports.

Inheritance diagram for WREBTestPDFGen.PDF:



Public Member Functions

- def [header](#) (self)
Adds a LSST/SLAC header and title to every page.
- def [footer](#) (self)
Adds page numbers to every page.
- def [testTitle](#) (self, title)
Generic title function for tests.
- def [summaryPage](#) (self, boardID, FPGAInfo, testList, passList, statsList)
Generate a summary page for the tests that were run.
- def [columnTable](#) (self, colData, colHeaders=None, fontSize=8, width=1.0, widthArray=None, align="L")
Generates a table from a list of lists of column data.
- def [addPlotPage](#) (self, title, imgName, imgSize=1.0)
Adds a page for tests with outputs consisting only of an image/plot.
- def [idleCurrent](#) (self, title, voltages, currents)
Idle current generation test, will be moved to [WREBTest.py](#) soon.
- def [residualTest](#) (self, title, datas, residuals, passed, stats, ROI=None, imgSize=0.7, xdat=None, plt↔ Range=None)
Report page for tests that consist of a single residual plot, including comments and pass/fail.
- def [makeResidualPlotPage](#) (self, title, imgName, datas, residuals, ROI=None, imgSize=1.0, xdat=None, plt↔ Range=None)
Generates the new page and plot for the residual tests.
- def [makePlotPage](#) (self, title, imgName, datas, imgSize=1.0, xdat=None)
Generates the new page and plot for the non-residual tests.
- def [passFail](#) (self, passed)
Return color-coded pass/fail result.

5.13.1 Detailed Description

PDF generation class for reports.

5.13.2 Member Function Documentation

5.13.2.1 `def WREBTestPDFGen.PDF.addPlotPage (self, title, imgName, imgSize = 1.0)`

Adds a page for tests with outputs consisting only of an image/plot.

Parameters

<i>title</i>	Title of test on page
<i>imgName</i>	File to save plot as
<i>imgSize</i>	Optional, percent of page width image should take up; defaults to 1.0

5.13.2.2 `def WREBTestPDFGen.PDF.columnTable (self, colData, colHeaders = None, fontSize = 8, width = 1.0, widthArray = None, align = "L")`

Generates a table from a list of lists of column data.

Parameters

<i>colData</i>	Tuple of column information as ([data], header) to be put in a column, from left to right.
<i>colHeaders</i>	Optional list of headers for columns; if specified, colData is expected as ([data],[data],...)
<i>fontSize</i>	Optional font size for the table.
<i>width</i>	Percent of page width the table should occupy.
<i>widthArray</i>	Non-normalized list of relative column widths. Defaults to every column having equal width.
<i>align</i>	Align as left ("L"), center ("C"), right ("R")

5.13.2.3 `def WREBTestPDFGen.PDF.footer (self)`

Adds page numbers to every page.

5.13.2.4 `def WREBTestPDFGen.PDF.header (self)`

Adds a LSST/SLAC header and title to every page.

5.13.2.5 `def WREBTestPDFGen.PDF.idleCurrent (self, title, voltages, currents)`

Idle current generation test, will be moved to [WREBTest.py](#) soon.

Parameters

<i>title</i>	Title of test on page
<i>voltages</i>	List of (category title, [voltages])
<i>currents</i>	List of (category title, [currents])

5.13.2.6 `def WREBTestPDFGen.PDF.makePlotPage (self, title, imgName, datas, imgSize = 1.0, xdat = None)`

Generates the new page and plot for the non-residual tests.

Parameters

<i>title</i>	Title of test on page
<i>imgName</i>	Title of temporary plot image
<i>datas</i>	Zipped data arrays and legend titles
<i>imgSize</i>	Optional, percent of page width image should take up; defaults to 1.0
<i>xdat</i>	Optional zipped array of x values and titles. Defaults to iteration values.

5.13.2.7 `def WREBTestPDFGen.PDF.makeResidualPlotPage (self, title, imgName, datas, residuals, ROI = None, imgSize = 1.0, xdat = None, pltRange = None)`

Generates the new page and plot for the residual tests.

Parameters

<i>title</i>	Title of test on page
<i>imgName</i>	Title of temporary plot image
<i>datas</i>	Zipped data arrays and legend titles
<i>residuals</i>	Zipped array of residuals and legend titles
<i>ROI</i>	Optional parameter specifying region of interest in the plot
<i>imgSize</i>	Optional, percent of page width image should take up; defaults to 1.0
<i>xdat</i>	Optional zipped array of x values and titles. Defaults to iteration values.
<i>pltRange</i>	Optional specified plot range.

5.13.2.8 `def WREBTestPDFGen.PDF.passFail (self, passed)`

Return color-coded pass/fail result.

Parameters

<i>passed</i>	String of either "PASS" or "FAIL"
---------------	-----------------------------------

5.13.2.9 `def WREBTestPDFGen.PDF.residualTest (self, title, datas, residuals, passed, stats, ROI=None, imgSize = 0.7, xdat=None, pltRange=None)`

Report page for tests that consist of a single residual plot, including comments and pass/fail.

Parameters

<i>title</i>	Title of test on page and title of temporary plot image
<i>datas</i>	Zipped data arrays and legend titles
<i>residuals</i>	Zipped array of residuals and legend titles
<i>passed</i>	Pass/fail result of test
<i>stats</i>	Relevant comments from the test
<i>ROI</i>	Optional parameter specifying region of interest in the plot
<i>imgSize</i>	Optional, percent of page width image should take up; defaults to 1.0
<i>xdat</i>	Optional zipped array of x values and titles. Defaults to iteration values.
<i>pltRange</i>	Optional specified plot range.

5.13.2.10 `def WREBTestPDFGen.PDF.summaryPage (self, boardID, FPGAInfo, testList, passList, statsList)`

Generate a summary page for the tests that were run.

Parameters

<i>boardID</i>	Serial number of the board that is tested
<i>FPGAInfo</i>	FPGA front-end software version
<i>testList</i>	List of test titles that were run
<i>passList</i>	List of test results
<i>statsList</i>	List of relevant statistics returned from the tests

5.13.2.11 `def WREBTestPDFGen.PDF.testTitle (self, title)`

Generic title function for tests.

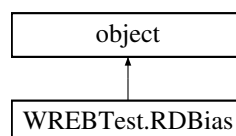
The documentation for this class was generated from the following file:

- [WREBTestPDFGen.py](#)

5.14 WREBTest.RDBias Class Reference

Tests the reset drain performance.

Inheritance diagram for WREBTest.RDBias:



Public Member Functions

- def `__init__` (self)
Initialize minimum required variables for test list.
- def `runTest` (self)
Run the test, save output to state variables.
- def `summarize` (self, summary)
Summarize the test results for the cover page of the report.
- def `report` (self, pdf)
generate this test's page in the PDF report.

5.14.1 Detailed Description

Tests the reset drain performance.

5.14.2 Constructor & Destructor Documentation

5.14.2.1 `def WREBTest.RDBias.__init__ (self)`

Initialize minimum required variables for test list.

5.14.3 Member Function Documentation

5.14.3.1 `def WREBTest.RDBias.report (self, pdf)`

generate this test's page in the PDF report.

Parameters

<code>pdf</code>	pyfpdf-compatible PDF object.
------------------	-------------------------------

5.14.3.2 `def WREBTest.RDBias.runTest (self)`

Run the test, save output to state variables.

5.14.3.3 `def WREBTest.RDBias.summarize (self, summary)`

Summarize the test results for the cover page of the report.

Parameters

<code>summary</code>	<code>Summary</code> obejct passed from FunctionalTest()
----------------------	--

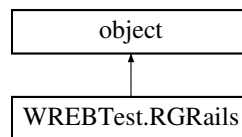
The documentation for this class was generated from the following file:

- [WREBTest.py](#)

5.15 WREBTest.RGRails Class Reference

Tests the reset gate rail performance.

Inheritance diagram for WREBTest.RGRails:



Public Member Functions

- def [__init__](#) (self)
Initialize minimum required variables for test list.
- def [runTest](#) (self)
Run the test, save output to state variables.
- def [summarize](#) (self, summary)
Summarize the test results for the cover page of the report.
- def [report](#) (self, pdf)
generate this test's page in the PDF report.

5.15.1 Detailed Description

Tests the reset gate rail performance.

5.15.2 Constructor & Destructor Documentation

5.15.2.1 def WREBTest.RGRails.__init__ (self)

Initialize minimum required variables for test list.

5.15.3 Member Function Documentation

5.15.3.1 def WREBTest.RGRails.report (self, pdf)

generate this test's page in the PDF report.

Parameters

<i>pdf</i>	pyfpdf-compatible PDF object.
------------	-------------------------------

5.15.3.2 def WREBTest.RGRails.runTest (self)

Run the test, save output to state variables.

5.15.3.3 def WREBTest.RGRails.summarize (self, summary)

Summarize the test results for the cover page of the report.

Parameters

<i>summary</i>	Summary object passed from FunctionalTest()
----------------	---

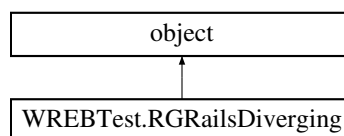
The documentation for this class was generated from the following file:

- [WREBTest.py](#)

5.16 WREBTest.RGRailsDiverging Class Reference

Tests the reset gate rail performance with a diverging voltage pattern.

Inheritance diagram for WREBTest.RGRailsDiverging:



Public Member Functions

- def [__init__](#) (self, amplitude, startV)
Initialize required variables for test list and stores input arguments to state variables.
- def [runTest](#) (self)
Run the test, save output to state variables.
- def [summarize](#) (self, summary)
Summarize the test results for the cover page of the report.
- def [report](#) (self, pdf)
generate this test's page in the PDF report.

5.16.1 Detailed Description

Tests the reset gate rail performance with a diverging voltage pattern.

5.16.2 Constructor & Destructor Documentation

5.16.2.1 `def WREBTest.RGRailsDiverging.__init__(self, amplitude, startV)`

Initialize required variables for test list and stores input arguments to state variables.

Parameters

<i>amplitude</i>	Maximum voltage differential between rails, half-wave. (5V amplitude is 10V max difference.)
<i>startV</i>	Initial voltage the diverging rails tests starts at.

5.16.3 Member Function Documentation

5.16.3.1 `def WREBTest.RGRailsDiverging.report(self, pdf)`

generate this test's page in the PDF report.

Parameters

<i>pdf</i>	pyfpdf-compatible PDF object.
------------	-------------------------------

5.16.3.2 `def WREBTest.RGRailsDiverging.runTest(self)`

Run the test, save output to state variables.

5.16.3.3 `def WREBTest.RGRailsDiverging.summarize(self, summary)`

Summarize the test results for the cover page of the report.

Parameters

<i>summary</i>	Summary object passed from FunctionalTest()
----------------	---

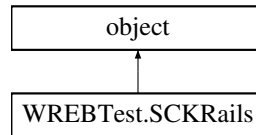
The documentation for this class was generated from the following file:

- [WREBTest.py](#)

5.17 WREBTest.SCKRails Class Reference

Tests the serial clock rail performance.

Inheritance diagram for WREBTest.SCKRails:



Public Member Functions

- def `__init__` (self)
Initialize minimum required variables for test list.
- def `runTest` (self)
Run the test, save output to state variables.
- def `summarize` (self, summary)
Summarize the test results for the cover page of the report.
- def `report` (self, pdf)
generate this test's page in the PDF report.

5.17.1 Detailed Description

Tests the serial clock rail performance.

5.17.2 Constructor & Destructor Documentation

5.17.2.1 def WREBTest.SCKRails.__init__ (self)

Initialize minimum required variables for test list.

5.17.3 Member Function Documentation

5.17.3.1 def WREBTest.SCKRails.report (self, pdf)

generate this test's page in the PDF report.

Parameters

<i>pdf</i>	pyfpdf-compatible PDF object.
------------	-------------------------------

5.17.3.2 `def WREBTest.SCKRails.runTest (self)`

Run the test, save output to state variables.

5.17.3.3 `def WREBTest.SCKRails.summarize (self, summary)`

Summarize the test results for the cover page of the report.

Parameters

<code>summary</code>	Summary object passed from FunctionalTest()
----------------------	---

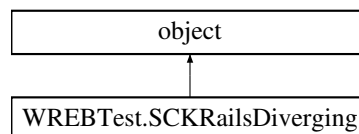
The documentation for this class was generated from the following file:

- [WREBTest.py](#)

5.18 WREBTest.SCKRailsDiverging Class Reference

Test the serial clock rail performance with a diverging voltage pattern.

Inheritance diagram for WREBTest.SCKRailsDiverging:



Public Member Functions

- `def __init__ (self, amplitude, startV)`
Initialize required variables for test list and stores input arguments to state variables.
- `def runTest (self)`
Run the test, save output to state variables.
- `def summarize (self, summary)`
Summarize the test results for the cover page of the report.
- `def report (self, pdf)`
generate this test's page in the PDF report.

5.18.1 Detailed Description

Test the serial clock rail performance with a diverging voltage pattern.

5.18.2 Constructor & Destructor Documentation

5.18.2.1 `def WREBTest.SCKRailsDiverging.__init__ (self, amplitude, startV)`

Initialize required variables for test list and stores input arguments to state variables.

Parameters

<i>amplitude</i>	Maximum voltage differential between rails, half-wave. (5V amplitude is 10V max difference.)
<i>startV</i>	Initial voltage the diverging rails tests starts at.

5.18.3 Member Function Documentation

5.18.3.1 `def WREBTest.SCKRailsDiverging.report (self, pdf)`

generate this test's page in the PDF report.

Parameters

<i>pdf</i>	pyfpdf-compatible PDF object.
------------	-------------------------------

5.18.3.2 `def WREBTest.SCKRailsDiverging.runTest (self)`

Run the test, save output to state variables.

Diverging SCK Rails test. Amplitude is half-wave maximum divergence, startV is initial voltage to start LV=UV diverging from.

5.18.3.3 `def WREBTest.SCKRailsDiverging.summarize (self, summary)`

Summarize the test results for the cover page of the report.

Parameters

<i>summary</i>	Summary obejct passed from FunctionalTest()
----------------	---

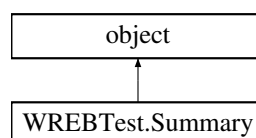
The documentation for this class was generated from the following file:

- [WREBTest.py](#)

5.19 WREBTest.Summary Class Reference

[Summary](#) object containing the needed information for the cover page.

Inheritance diagram for WREBTest.Summary:



Public Member Functions

- `def __init__ (self)`
Initialize the list of tests, the list of passes/fails, and the list of results.

5.19.1 Detailed Description

[Summary](#) object containing the needed information for the cover page.

5.19.2 Constructor & Destructor Documentation

5.19.2.1 `def WREBTest.Summary.__init__ (self)`

Initialize the list of tests, the list of passes/fails, and the list of results.

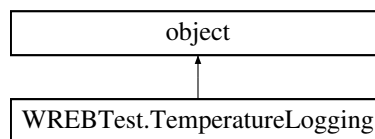
The documentation for this class was generated from the following file:

- [WREBTest.py](#)

5.20 WREBTest.TemperatureLogging Class Reference

Requests temperature logs for WREB.Temp(1-6) and CCD since the test started from the board's database.

Inheritance diagram for WREBTest.TemperatureLogging:



Public Member Functions

- `def __init__ (self, startTime)`
Initialize required variables for test list.
- `def runTest (self)`
Run the test, save output to state variables.
- `def summarize (self, summary)`
Summarize the test results for the cover page of the report.
- `def report (self, pdf)`
generate this test's page in the PDF report.

5.20.1 Detailed Description

Requests temperature logs for WREB.Temp(1-6) and CCD since the test started from the board's database.

5.20.2 Constructor & Destructor Documentation

5.20.2.1 `def WREBTest.TemperatureLogging.__init__ (self, startTime)`

Initialize required variables for test list.

Parameters

<i>startTime</i>	Time to request temperature data since. Should be the beginning time of this test.
------------------	--

5.20.3 Member Function Documentation

5.20.3.1 def WREBTest.TemperatureLogging.report (*self*, *pdf*)

generate this test's page in the PDF report.

Parameters

<i>pdf</i>	pyfpdf-compatible PDF object.
------------	-------------------------------

5.20.3.2 def WREBTest.TemperatureLogging.runTest (*self*)

Run the test, save output to state variables.

5.20.3.3 def WREBTest.TemperatureLogging.summarize (*self*, *summary*)

Summarize the test results for the cover page of the report.

Parameters

<i>summary</i>	Summary object passed from FunctionalTest()
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The documentation for this class was generated from the following file:

- [WREBTest.py](#)

Chapter 6

File Documentation

6.1 WREBTest.py File Reference

Suite of tests for the WREB controller board.

Classes

- class [WREBTest.JythonInterface](#)
Some hacky workarounds to clean up the limited communication with the Jython interface.
- class [WREBTest.IdleCurrentConsumption](#)
Test for idle current consumption in the WREB board.
- class [WREBTest.ChannelTest](#)
Tests number of communicable channels available to the board.
- class [WREBTest.ASPICcommsTest](#)
Tests that the board can communicate with the ASPICS.
- class [WREBTest.CSGate](#)
Tests the current source gate.
- class [WREBTest.PCKRails](#)
Test the parallel clock rail performance.
- class [WREBTest.SCKRails](#)
Tests the serial clock rail performance.
- class [WREBTest.SCKRailsDiverging](#)
Test the serial clock rail performance with a diverging voltage pattern.
- class [WREBTest.RGRails](#)
Tests the reset gate rail performance.
- class [WREBTest.RGRailsDiverging](#)
Tests the reset gate rail performance with a diverging voltage pattern.
- class [WREBTest.OGBias](#)
Tests the output gate performance.
- class [WREBTest.ODBias](#)
Tests the output drain performance.
- class [WREBTest.GDBias](#)
Tests the guard drain performance.
- class [WREBTest.RDBias](#)
Tests the reset drain performance.

- class [WREBTest.TemperatureLogging](#)
Requests temperature logs for WREB.Temp(1-6) and CCD since the test started from the board's database.
- class [WREBTest.ASPICNoise](#)
Measure noise distribution in ASICs for the unclamped, clamped, and reset cases.
- class [WREBTest.Summary](#)
Summary object containing the needed information for the cover page.
- class [WREBTest.FunctionalTest](#)
Runs the functional testing suite.
- class [WREBTest.GUI](#)
Dialog-based GUI for displaying test progress and navigating options.

Functions

- def [WREBTest.resetSettings](#) ()
Reset the board settings for use in between tests.
- def [WREBTest.exitScript](#) ()
Reset settings and exit.
- def [WREBTest.voltsToRailDAC](#) (V, rf, ri)
Given a voltage, return a pair of voltage, shift DAC values.
- def [WREBTest.setRGRailVoltage](#) (lowV, highV, rf=49.9, ri=20.0)
Set the voltage for the RG rail system.
- def [WREBTest.setSCKRailVoltage](#) (lowV, highV, rf=49.9, ri=20.0)
Set the voltage for the SCK rail system.
- def [WREBTest.convert](#) (value, type_)
Converts a value to the specified type.
- def [WREBTest.printv](#) (string)
Print if verbose is enabled.

6.1.1 Detailed Description

Suite of tests for the WREB controller board.

This program communicates directly with the Jython interpreter to manipulate the board, so it does not need to be loaded into the Jython executor.

External dependencies:

- astropy
- numpy
- matplotlib

To run:

- Ensure Jython console is running (./JythonConsole or the bootstrapper program)
- Ensure crRun.sh is running
- Ensure DACs are loaded in the CCS console

- "python WREBTest.py [options]" Initial crashing yielding a ValueError is likely due to a crRun or JythonConsole crashing or not being loaded.

Tests are structured as classes with four required methods:

- **init** sets initial variables; minimum required variables are self.title and self.status.
- runTest is the body of the tests, running the code to execute the tests and storing the results to state variables.
- summarize writes summary information to the summary object passed to it; this is used in generating the cover page.
- report writes the portion of the pdf report that the test is responsible for. Tests are executed from a list of test objects defined in FunctionalTest().

6.1.2 Function Documentation

6.1.2.1 def WREBTest.convert (*value*, *type_*)

Converts a value to the specified type.

Parameters

<i>value</i>	Value to be converted
<i>type_</i> ↔	Type to convert to.
—	

Returns

Converted value

6.1.2.2 def WREBTest.exitScript ()

Reset settings and exit.

Usually catches ^C.

6.1.2.3 def WREBTest.printv (*string*)

Print if verbose is enabled.

6.1.2.4 def WREBTest.resetSettings ()

Reset the board settings for use in between tests.

6.1.2.5 def WREBTest.setRGRailVoltage (*lowV*, *highV*, *rf* = 49.9, *ri* = 20.0)

Set the voltage for the RG rail system.

Parameters

<i>lowV</i>	Desired lower rail voltage.
<i>highV</i>	Desired upper rail voltage
<i>rf</i>	Optional op-amp Rf, defaults to 49.9 Ohm.
<i>ri</i>	Optional op-amp Ri, defaults to 20.0 Ohm.

6.1.2.6 `def WREBTest.setSCKRailVoltage (lowV, highV, rf = 49.9, ri = 20.0)`

Set the voltage for the SCK rail system.

Parameters

<i>lowV</i>	Desired lower rail voltage.
<i>highV</i>	Desired upper rail voltage
<i>rf</i>	Optional op-amp Rf, defaults to 49.9 Ohm.
<i>ri</i>	Optional op-amp Ri, defaults to 20.0 Ohm.

6.1.2.7 `def WREBTest.voltsToRailDAC (V, rf, ri)`

Given a voltage, return a pair of voltage, shift DAC values.

Parameters

<i>V</i>	Desired output voltage
<i>rf</i>	Op-amp Rf
<i>ri</i>	Op-amp Ri

Returns

(voltage, shift voltage)

6.2 WREBTestPDFGen.py File Reference

Contains common PDF generation routines for the WREB test report.

Classes

- class [WREBTestPDFGen.PDF](#)
PDF generation class for reports.

Functions

- def [WREBTestPDFGen.residualPlots](#) (datas, residuals, saveAs, ROI=None, xdat=None, pltRange=None)
Generates a set of plots and residuals.
- def [WREBTestPDFGen.multiPlots](#) (datas, saveAs, xdat=None)
Generates a set of plots.

6.2.1 Detailed Description

Contains common PDF generation routines for the WREB test report.

External dependencies:

- Matplotlib
- Numpy

6.2.2 Function Documentation

6.2.2.1 def WREBTestPDFGen.multiPlots (datas, saveAs, xdat = None)

Generates a set of plots.

Parameters

<i>datas</i>	Zipped data arrays and legend titles
<i>saveAs</i>	Filename to save plot as
<i>xdat</i>	Optional zipped array of x values and titles. Defaults to iteration values.

6.2.2.2 def WREBTestPDFGen.residualPlots (datas, residuals, saveAs, ROI = None, xdat = None, pltRange = None)

Generates a set of plots and residuals.

Parameters

<i>datas</i>	Zipped data arrays and legend titles
<i>residuals</i>	Zipped array of residuals and legend titles
<i>saveAs</i>	Filename to save plot as
<i>ROI</i>	Optional parameter specifying region of interest in the plot
<i>xdat</i>	Optional zipped array of x values and titles. Defaults to iteration values.
<i>pltRange</i>	Optional specified plot range.

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