

Keysight Technologies

Test Coverage Consultant

Technical Overview

TEST COVERAGE CONSULTANT REPORT FOR ICT

| | | | |
|---------------------|-----------|------------------------|-------------------|
| BOARD NAME / NUMBER | ANGELA_BD | DATA PROCESSING REPORT | WRK:ANGELA_BD.htm |
| COMPONENT | 51 | COMPONENT TESTED | 81.58% |
| NET | 199 | NET ACCESS | 98.99% |
| SHORT COVERAGE | 100.00% | BOARD SCORE | 82.39% |

TEST TECHNIQUES USED

| ACCESS | Test_Point | | UNPOWERED ANALOG | Yes | POWERED ANALOG | No | |
|--------------|------------|---------------|------------------|----------------|----------------|-----------------|-----|
| DIGITAL | No | CONNECT CHECK | No | POLARITY CHECK | No | VECTORLESS TEST | Yes |
| INTERCONNECT | No | IEEE 1149.6 | No | SILICON NAILS | No | COVER EXTEND | No |
| MAGIC TEST | No | NPM | No | LIGHTPROBE | No | | |

| DEVICE TYPE | TOTAL NUMBER (PARTS OR PINS) | Number of well tested | Number of partially tested | Number of not tested |
|--------------------|------------------------------|-----------------------|----------------------------|----------------------|
| Integrated Circuit | 6 Parts (106 Pins) | 0.0% (0) | 100.0% (6) | 0.0% (0) |
| Capacitor | 10 Parts | 40.0% (4) | 0.0% (0) | 60.0% (6) |
| Resistor | 20 Parts | 100.0% (20) | 0.0% (0) | 0.0% (0) |
| Crystal | 1 Parts | 0.0% (0) | 0.0% (0) | 100.0% (1) |
| Connector | 1 Parts (16 Pins) | 100.0% (1) | 0.0% (0) | 0.0% (0) |
| Not Mounted | 11 Parts | | | |
| Mechanical | 2 Parts | | | |
| Total | 38 Parts (13 ignored) | 65.8% (25) | 15.8% (6) | 18.4% (7) |



Introduction

The Keysight Technologies, Inc. Test Coverage Consultant (KTCC) is a standalone application that can be installed on your Windows PC to enable you to quickly generate test coverage reports for your products.

Powered by Aster Technologies' Testway engine, the tool can objectively review the board CAD files or board test files to generate a comprehensive report using the PCOLA-SOQ metrics.

The Keysight Test Coverage Consultant is equipped with the knowledge of Keysight's In-Circuit test features so that you are able to analyze how the test coverage changes depending on the test features enabled. This allows you to determine exactly what coverage is available for the tester on your production line equipped with the latest test features.

This quick guide is designed to help you to get the Keysight Test Coverage Consultant up and running on your PC quickly. It guides you through the license redemption procedure and software installation steps and provides instructions for generating a test coverage report of a sample board.

What You Need

You need the following prior to installing and running the Keysight Test Coverage Consultant. Minimum system requirements – see “System requirements.”

Licensing

| Keysight Test Coverage Consultant software package |
|---|
| CD containing Software installation files |
| A valid USB Dongle |
| Certificate of entitlement which includes instructions to redeem the software license |
| Keysight Test Coverage Consultant software requirements |
| A valid USB Dongle provided by Keysight |
| A valid software license file provided by Keysight |

Redemption of Software license file

A certificate of entitlement will be shipped together with the USB Dongle and Software installation CD. Please follow the instructions on the certificate to redeem your software license from Keysight.

E-mail the following information to ktcc_support@keysight.com for the license redemption:

| |
|--|
| Name |
| Company name |
| Company address |
| Function |
| City/Country |
| Phone |
| E-mail |
| Dongle number |
| Software Type: Basic/Advanced |
| Reader: CAMCAD/Test Expert (formerly known as Fabmaster)/TestSight |

A software license file will be sent to you within two days. This software license file is non-transferable and can only be used with the Dongle that was shipped to you.

System requirements

This software can be run on a PC.

| | | | | |
|---------------------------|--|---------------|-------------------|-------|
| Operating system | Windows 98 ME, 2000, NT 4.0 SP6, XP Pro, Vista and Windows 7 | | | |
| Display | Super VGA (1024 x 768) or higher-resolution video adapter and monitor | | | |
| Hard disk | 800 MB available hard-disk space | | | |
| Mouse | | | | |
| Ports | Parallel, serial or USB port (parallel port or USB port are recommended) | | | |
| Browser | Microsoft Internet Explorer 5.0 or higher | | | |
| Minimum processor and RAM | | RAM (minimum) | RAM (recommended) | CPU |
| | Windows 7 | 1 GB | 2 GB | 1 Ghz |
| | Vista | 1 GB | 2 GB | 1 Ghz |
| | XP pro | 256 MB | 1 GB | P300 |
| | 2000 pro | 128 MB | 512 MB | P200 |
| | ME | 64 MB | 256 MB | P200 |
| | NT4 SP6 | 64 MB | 256 MB | P100 |
| | 98 | 32 MB | 128 MB | P100 |

What You Need

Software installation

Install the Keysight Test Coverage Consultant onto your PC

1

Download the installer from <http://www.keysight.com/find/ktcc> or insert the CD into your PC

2

Execute the installation wizard and allow it to complete using the default values

3

The application will be found in C:\TESTWAY directory

4

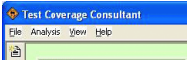
Prior to launching application, plug in the USB Aladdin Dongle into a free USB port on your PC

5

Save the software license file license.ini into the C:\TESTWAY directory

6

Check that you have a good installation by launching the application. You should see the following Window name ...



7

If not, please re-install the software

Input processors

When you selected either the BASIC or ADVANCED package, you would need to specify one of the input processors that you require. The input processors available are able to read the outputs of the following CAD converters; CAMCAD, Test Expert (or Fabmaster) and TestSight.

| Files output from CAD converters | |
|----------------------------------|----------------------|
| CAMCAD | .cc |
| | .ccz |
| FATF | FATF.asc |
| | Labelset.asc |
| | Device.asc |
| | Nails.asc |
| TestSight | GenCAD format output |

Using CAD converter applications, you can select the probes that you need for your product and after running the output from the CAD converter application through the Keysight Test Coverage Consultant, you can know how the coverage is affected.

Additional CAD input processors can be purchased directly from Aster Technologies:

| | | |
|-----------|-----------|-------------|
| - IPC256 | - CADIF | - CR5000-BD |
| - GenCAD | - Mentor | - Protel |
| - GenCAM | - Neutral | - RPDATA |
| - ODB++ | - ORCAD | - UNICAD |
| - Cadence | - PCB | - AQS |

What You Need

Test platforms supported and selection

The Keysight Test Coverage Consultant supports the Keysight In-Circuit test platforms (i3070 and i1000) and, with the Advanced package, the 5DX and SP50 imaging inspection systems as well. These processors are verified by Keysight.

These test platform processors will read the developed tests in the board directory to calculate the actual test coverage of the developed test for the product.

Additional platforms can be obtained from Aster Technologies directly. These have not been verified by Keysight.

- Acculogic (BS, Scorpion, SPRINT)
- ASSET, CORELIS, GOEPEL (CASCON, OPTICON)
- JTAG Technologies
- XJTAG
- Mirtec
- MYDATA
- OMRON
- Orbotech
- SAKI
- SEICA
- SPEA (4040)
- TAKAYA (APT8000, APT9000)
- TRI (TR7500)
- VISCOR
- ViTechnology
- YESTech

Keysight i3070: generate the Coverage Analyst report. This is the input into the Keysight Test Coverage Consultant tool.

- 1 Generate the test coverage report using Coverage Analyst within the test directory using the normal methods
- 2 In the Keysight Test Coverage Consultant tool, select **Analysis>Test Program Quality**
- 3 Drag the “KEYSIGHT i3070” icon into the “Test Line”
- 4 Right click the Keysight i3070 icon on the Test Line and select **Tester Settings**
- 5 In the Tester Settings window, click **Add** to include the location of the Coverage Analyst report. Select the StartHere.htm file in the Coverage Analyst report directory ... C:\TESTWAY\KTCC\<board>\i3070\ca_report\StartHere.htm
- 6 Click **Add > OK** after specifying the path name

Keysight i1000: specify the test description file

- 1 Generate the test on the i1000
- 2 In the Keysight Test Coverage Consultant tool, select **Analysis>Test Program Quality**
- 3 Drag the “KEYSIGHT i1000” icon into the “Test Line”
- 4 Right click the Keysight i1000 icon on the Test Line and select **Tester Settings**
- 5 In the Tester Settings window, click **Add** and navigate to the i1000 test directory.
- 6 Select the i1000 .atd file in the board test directory.
For example, C:\TESTWAY\KTCC\<board>\i1000\boardname.atd
- 7 Click **Open > OK** to make the selection

SJ50: specify the test plan file

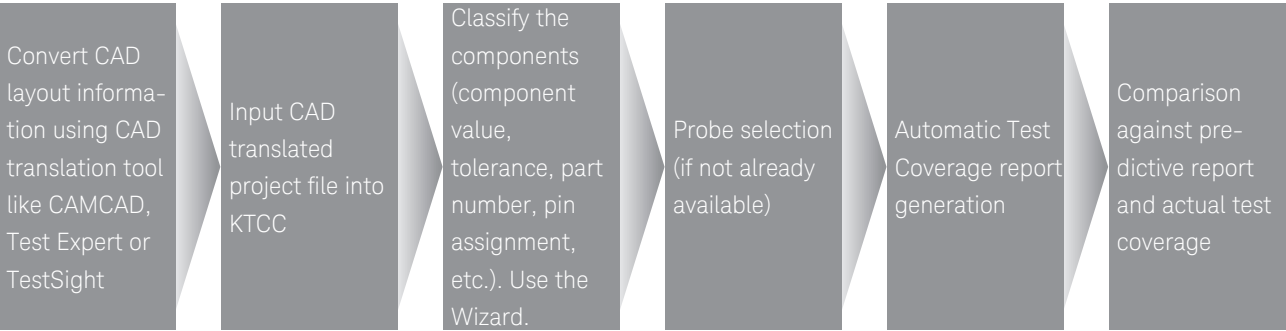
- 1 Generate the test on the SJ50
- 2 In the Keysight Test Coverage Consultant tool, select **Analysis>Test Program Quality**
- 3 Drag the “SJ10-SJ50” icon into the “Test Line”
- 4 Right click the SJ10-SJ50 icon on the Test Line and select **Tester Settings**
- 5 In the Tester Settings window, click **Add** and navigate to the SJ50 test directory
- 6 Select the SJ50 .pls file in the board test directory.
For example, C:\<board>\boardname.pls
- 7 Click **Open > OK** to make the selection

5DX: specify the test components files

- 1 Generate the test on the 5DX
- 2 In the Keysight Test Coverage Consultant tool, select **Analysis>Test Program Quality**
- 3 Drag the “5DX” icon into the “Test Line”
- 4 Right click the 5DX icon on the Test Line and select **Tester Settings**
- 5 In the Tester Settings window, click **Add** and navigate to the 5DX test directory
- 6 Select the 5DX .ndf file in the board test directory.
For example, C:\<board>\boardname.ndf
- 7 Click **Open > OK** to make the selection

How to generate a test coverage report

Compared to other tools, the Keysight Test Coverage Consultant is an automatic and objective tool that provides a complete picture of the test coverage of your product using the PCOLA-SOQ metrics.



Steps required to generate a test coverage report using the Keysight Test Coverage Consultant

Input the test information for actual test coverage reporting

When generating the test coverage of a developed test, only the test directory is required.

When analyzing the actual i3070 test coverage of a test developed board, the actual tests in the board directory and the Keysight Coverage Analyst report is required. The Keysight Test Coverage Consultant will read the Keysight Coverage Analyst report as well as other files in the board test directory to generate the full test coverage report.

When analyzing the actual i1000 test coverage of a test developed board, the board .atd file is required. The Keysight Test Coverage Consultant will generate the test coverage report based on the information in the .atd file.

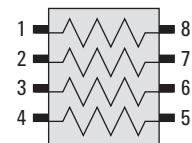
After selecting **Analysis > Test Program Quality**, drag the Keysight i3070 or Keysight i1000 icon into the Test Line. Right click the icon and select **Test Settings**. Then select the Start.htm for i3070 or ATD file for i1000 and click **Analyze** to generate the actual test coverage report.

| Steps required for predictive test coverage generation | | |
|--|---|--|
| 1 | Input board data for test coverage prediction | <p>The Schematics, bill of materials (BOM) and especially the output of a CAD translation tool are essential information for an accurate test coverage prediction. As a minimum, the output of a CAD translation tool is required. The supported CAD translation tool outputs are CAMCAD, Test Expert (formerly known as Fabmaster) and TestSight. Using the CAD conversion tool, the testpoints should be selected so that they can be taken into account by the Keysight Test Coverage Consultant. The component value and tolerance should also be updated with the latest BOM.</p> <p>Without the processing by CAD translation tools, the correct CAD input processor needs to be purchased from Aster directly to read the CAD layout file. The BOM can be read using a text Grammer file indicating the locations of the part number, value, tolerances, etc., that you create to indicate to the Keysight Test Coverage Consultant where to find the information in the BOM. The Keysight Test Coverage Consultant has a in-built tool to select the available testpoints on the design.</p> |
| 2 | Digitize schematics | <p>The advanced version of the Keysight Test Coverage Consultant, is able to digitize the .pdf format of the schematics file. This allows the views to be updated to the selected component even in the schematics. In this way, you can get a better understanding of the surround components around the selected component. The schematics must be saved in a searchable PDF format.</p> |
| 3 | Display Netlist graphically | <p>The advanced version of the Keysight Test Coverage Consultant can also display the Netlist in graphical form. By selecting a particular node, you can see the test access at this node, the attached components as well as the opposite or adjacent node across the components on this node. This gives you another view of the surrounding of the component based on the selected node.</p> |

How to generate a test coverage report

Steps required for predictive test coverage generation

| | | |
|---|-------------------------------------|---|
| 4 | Classify components | <p>In order to do an analysis of the test coverage, the Keysight Test Coverage Consultant needs to know what the types of components on the board are. The Component Classifier allows you to classify the components that the Keysight Test Coverage Consultant has extracted from the translated CAD files. The information required are the Class of component, Value, Tolerance, Split and location of any Model files. The Component Wizard found in the Component Classifier will automatically classify most of the analog components. Any component that the Wizard tool finds without enough information or with suspected incorrect information, will be highlighted in RED. You will have to manually classify these components. An indication of the information missing is specified in the "Status" column of the Component Classifier.</p> |
| | Class | <p>The class of the component tells the type of component, indicated as Capacitor, Resistor, Oscillator, Connector, IC, etc. Based on the type of the component, the Classifier will expect the relevant information for that component using a predefined set of rules. For example, if a Resistor is specified, the Classifier would expect to see the resistance of the resistor specified under the Value column and in the correct range. If there are any errors, it will display an error message in the Status column and highlight that component in RED.</p> |
| | Value and tolerance | <p>This is the value and tolerance found in the CAD and possibly updated using the BOM. Depending on the type of component, the value and tolerance may not be applicable. For example, the value and tolerances are not required for ICs. The range of the value and tolerance will be checked depending on the class of component specified.</p> |
| | Split | <p>This is a way to indicate to the Keysight Test Coverage Consultant the internal configuration of a component. This definition improves the test coverage analysis for that component. For example, for a resistor array, the way the internal resistors are connected to the component pins can be defined as "[1,8],[2,7],[3,6],[4,5]". Where the numbers within each square bracket indicates the component pins where an internal resistor is connected.</p> |
| | Digital libraries | <p>For digital components, the Keysight Test Coverage Component assumes that you have test coverage for that component based on the pins that you define. The pin definition can be input into the Keysight Test Coverage Consultant by defining it in the Keysight Vector Control Language (VCL) or Pattern Capture Format (PCF) used in Keysight's digital tests. The path name to the file containing the component definition or pin assignment in VCL or PCF format is indicated under the Model column of the component. In this way, any existing Keysight library for that type of component can be used to define the pin assignments for that digital component thus simplifying the classification process in the Keysight Test Coverage Consultant.</p> |
| | BSDL | <p>As with the digital components, if the digital component is a boundary scan compliant component, the Boundary Scan Description Language (BSDL) file for that component is indicated under the Model column instead of the digital library. This indicates to the Keysight Test Coverage Consultant that the component is boundary scan compliant and will be specially treated with additional rules around any boundary scan features like 1149.6 or the Keysight Cover-Extend Technology (CET) during the test coverage analysis.</p> |
| 5 | Update using Bill of Material (BOM) | <p>The bill of materials can be input into the Keysight Test Coverage Consultant during the test coverage analysis. This ensures that the latest component values and information is loaded into the tool for analysis. The BOM must be saved in CSV format before it can be input into the Keysight Test Coverage Consultant. A Grammar file in text format must be created to indicate and define to the Keysight Test Coverage Consultant how the information in the BOM is organized. A detailed description of the input process and syntax of the Grammar file is found in the HELP manual in the Keysight Test Coverage Consultant.</p> |
| 6 | Assign probes | <p>During the predictive test coverage analysis, the Keysight Test Coverage Consultant can make use of test access and probe locations if available. The probe locations can be assigned during the CAD translation stage using a separate CAD translation tool. If this is not available, the Keysight Test Coverage Consultant has a simple-to-use probe assignment tool that will assign a probe to accessible nodes based on criteria such as bottom or top side, through-hole, via-hole, surface mount pads and testpoints assigned in the CAD. This step is generally required when a raw CAD file is read.</p> |



Resistor pack

Split definition:

[1,8],[2,7],[3,6],[4,5]

How to generate a test coverage report

Steps required for predictive test coverage generation

| | |
|---|--|
| 7 | <p>Generate the reports</p> <p>When generating the reports for predictive test coverage, you can select the type of Keysight test features to include in the test coverage analysis by right clicking the “ict” icon after you drag it to the Test Line. Select Test Settings from the pop up menu to bring you to the Test Settings window. Here you can select Full, to do the analysis based on the assumption that all the nodes are accessible, or you can select Testpoints to do the analysis based on the selected testpoints.</p> <p>You can also select the Keysight test features by checking the boxes next to the feature. More than one feature can be selected for the analysis. The features ticked can reflect the software feature licenses available on the testers. After generating the test coverage report, the user can change the settings to generate another report for comparison. Please save the former report before generating a next one as it will get overwritten.</p> <p>The test coverage reports are in HTML format. If more than one tester is loaded on the test line, all the reports for the testers will be generated individually. A combined report will be generated In HTML format that will show the maximum coverage based on the all the testers on the Test Line. As the files are in html format, it can be browsed like an internet browser. The user can easily drill down to the details of the pin coverage or view the summary report as needed by click on the relevant links.</p> <p>The summary report shows the coverage for each component category as well as the Keysight test features that were taken into account for the test coverage analysis. All the reports are found in the DftChecker director under the KTCC directory in the directory that the Keysight Test Coverage Consultant is installed in.</p> |
| 8 | <p>Coverage comparison</p> <p>The Keysight Test Coverage Consultant will output the difference in test coverage between the predictive test coverage and the actual test coverage in an easy-to-sort excel sheet format. This allows the user to view the data according to how he likes, thus giving him greater analysis powers.</p> <p>A Comma-Separated Values (CSV) or Semi-colon Separated (CSV) table of comparison is generated based on the first and second testers defined in the Test Line. The test coverage for each component is compared side by side for each tester for each PCOLA-SOQ category. A Status column at the end of the table indicates if all the values in each PCOLA-SOQ section or not.</p> <p>As the file is formatted in fields, it can be read by a spreadsheet application, allowing the data to be sorted and arranged for better viewing and understanding by the user, according to the needs of the user. All the reports are found in the DftChecker director under the KTCC directory in the directory that the Keysight Test Coverage Consultant is installed in.</p> |

Easy to use, easy to analyze

With the above described tools, the Keysight Test Coverage Consultant is the best tool for your analysis of the predictive test coverage and the actual test coverage of the board that you want to test.

Use of this tool

Multi-uses for the Keysight Test Coverage Consultant

Validation of design for test levels of a newly laid out product at R&D

A quick prediction of test coverage for test services quotation

Actual test coverage report generation

Test strategy analysis based on total coverage from different testers

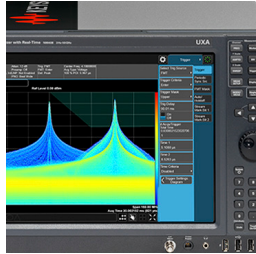
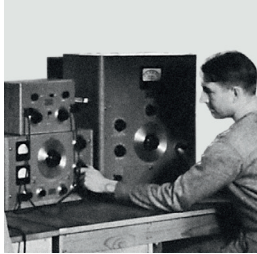
For more information

| | |
|------------------------|--|
| Web site | http://www.keysight.com/find/ktcc |
| HELP manual | The HELP manual in the Keysight Test Coverage Consultant software provides a good source for information |
| Send your questions to | ktcc_support@keysight.com |

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For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at:

www.keysight.com/find/contactus

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|---------------|------------------|
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| | |
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