Slashing Debugging Time with the Agilent *Medalist* i3070 In-Circuit Test AutoDebug Tool

Application Note

Introduction

This application note provides an overview of the AutoDebug tool that was introduced with the Agilent *Medalist* i3070 In-Circuit Test (ICT) Software version 07.00 and subsequent versions. It describes key features of this new tool and how users can get the most from it.

With the *Medalist* i3070, unpowered passive analog components can be automatically debugged with the click of a button, significantly slashing the time an engineer traditionally used to spend to debug a new ICT program. This AutoDebug tool is accessible from the graphical debug interface. It is an essential and useful feature that can help new engineers with limited ICT and circuit analysis experience perform analog debugging effectively.

With AutoDebug, the user can fine-tune analog unpowered tests using a set of rules that can be modified so that the analog tests or boards pass reliably in production. Comprehensive and predefined sets of rules are provided for each device type. The

rules mimic the actions that an engineer will need to carry out during the debug or fine-tuning process for each component type, hence enabling debug accuracy. Statistical measures with Cpk process capability indices are employed to determine the stability of the tests. Upon running the selected test, the tool captures measurement data, evaluates the data, adds or deletes measurement options and compiles the tests, thus reducing the time it takes to get a new test debugged and running in the actual production environment.

AutoDebug can save engineers four hours or more in terms of debugging time, depending on the program complexity. Prior to the introduction of AutoDebug, a test engineer would have had to spend at least one to two days to perform numerous manual steps when debugging tests. These included:

1. Debugging each failed test manually using Push Button Debug. This could mean hundreds of such manual tests, depending on the size of the board.

2. Manually sequencing the order of the tests with various measurement options.

3. Running a number of boards through a test after it has been debugged to confirm the stability of the edited tests. If the tests failed intermittently failing, they had to be re-debugged to increase the test stability.

4. Difficulty faced by new ICT users in analyzing circuits while debugging the tests.

With the Agilent *Medalist* i3070, unpowered passive analog components can be debugged with the click of a button, so even someone with limited ICT experience can perform a complete analog test debug in a matter of hours. AutoDebug fine-tunes tests so boards pass reliably in production. It runs the selected test, captures measurement data, evaluates the data, adds or deletes measurement options, and compiles the tests. The user sets the rules, and AutoDebug does the rest.

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How to Use the AutoDebug Tool

Figure 1 shows AutoDebug feature in the graphical user interface.

1. Select one or more tests.

2. Click the '**AutoDebug**' tab.

3. AutoDebug will validate all the rules that are predefined in the rule-sets.

4. The rules are applied one at a time; the tool will change, add or delete measurement options where necessary.

5. For each rule that is changed, the tool re-runs and captures the measurement data, then evaluates the data.

6. If the test is passed, a stability test is performed.

7. The parameters for a successfully debugged test are then updated and shown on the screen.

8. The tool will then automatically select the "**Save Testsource**" option.

9. Two log files can be found at Agilent_ICT/log for the user to review.

10. The system will automatically proceed to the next selected test if a series of tests has been selected.

Figure 1. This interface shows the AutoDebug tab and AutoDebug log.

Customizing AutoDebug Rules and Rule-Set

The test engineer can tailor the predefined rules and rule-sets to suit the debug requirements. The engineer can create new rules and rule-set for different debug situations. These situations can include changing the process capability index (CPK), customizing the number of times to run and evaluate the data, changing the order which the rules are followed, etc.

To launch the AutoDebug rule editor, select **Action > Autodebug > Rule Editor**. A window will pop up as shown in Figure 2.

A rule defines the actions that AutoDebug performs during the debug process. A rule can contain one or more actions and may be applied to more than one device types depending on the actions defined. The default rule-set and rule names provided by the Agilent *Medalist* AutoDebug tool have rule names beginning with "Agilent_"

Creating a new rule in Rule Database

The user can create a new rule if he or she cannot identify any suitable rule from the predefined rules provided for the AutoDebug process.

Create a new rule in Rule Database	
Name the new rule	In the rule definition panel (Rule Database): 1. Click **New** 2. Type a name for the new rule 3. Click **OK** 4. Add a description for the rule if you wish
Choose how to apply the rule's actions	In the Rule Formulation section, choose: **Merge to Existing Test** or **Start as New Test**
Assign actions to the rule	In the Rule Action section: 1. Select the action from the **Available Action** list 2. Click **<<** to confirm selection of the **Assigned Action** that will be attached to the created rule 3. Customize the parameters, if any, for the action
Specify the requirements for stability testing (optional)	1. To enable stability testing, select **Turn On Stability Test** 2. Specify the number of **Runs** and the **minimum CPK** that must be met.
Save the rule	In the rule definition panel: 1. Click **Save**

The saved rule appears in the Rule Database table, where it can be selected for assignment to the applicable device families. Figure 2 shows a new rule "ALT ed & freq" has been created and available on Rule Database for assignment.

Customizing AutoDebug Rules and Rule-Set

Creating new rule-sets

A rule-set is created for a specific device type and contains one or more rules. Rules define the actions that will be taken during the AutoDebug process.

Create a new rule-set for a device type	
Select device type	In the navigation panel: 1. Select the device type 2. Click **New**
Name the new rule-set	1. Type a name for the new rule-set. Make sure that the rule-set name is unique in the device family. 2. Click **OK**
Add the rule to the rule-set	From the Rule Database table: 1. Select the rule 2. Click **Assign** 3. Repeat this step if you wish to add more rules to the rule set.

Figure 2 shows an example of a new rule-set labeled as "Alternative" that has been created for the "capacitor" device type. Three rules have been assigned to this "Alternative" rule-set.
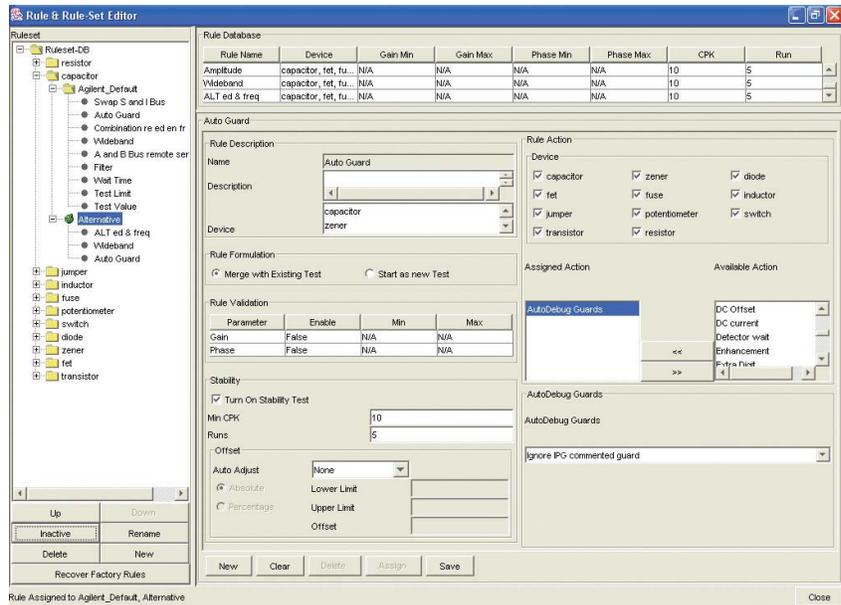
Figure 2. Rule and rule-set editor screen.

Customizing AutoDebug Rules and Rule-Set

For more information about the AutoDebug rule editor panel and features, please refer to **Features of the AutoDebug Rule Editor** of the **Agilent *Medalist* i3070 On-Line Help** on the following three chapters:

1. Navigation Panel

2. Rule Database

3. Rule Definition Panel

What can the user do if AutoDebug fails?

When AutoDebug fails to find the appropriate measurement options either due to limited predefined rules needed to achieve the required results or when it fails to achieve the desired test stability after the rule(s) have been applied, the engineer will have to manually debug and modify the tests where necessary. However, this will still take much lesser effort compared to the debug process that engineers had to go through prior to the introduction of the AutoDebug Tools.

Conclusion

The AutoDebug software uses rules to automate debugging and fine-tuning of tests. New and relatively inexperienced ICT engineers will benefit from this intuitive and time-saving tool. It is designed to help users become more successful at debugging their in-circuit tests and consequently, boost production and improve system up-time.

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