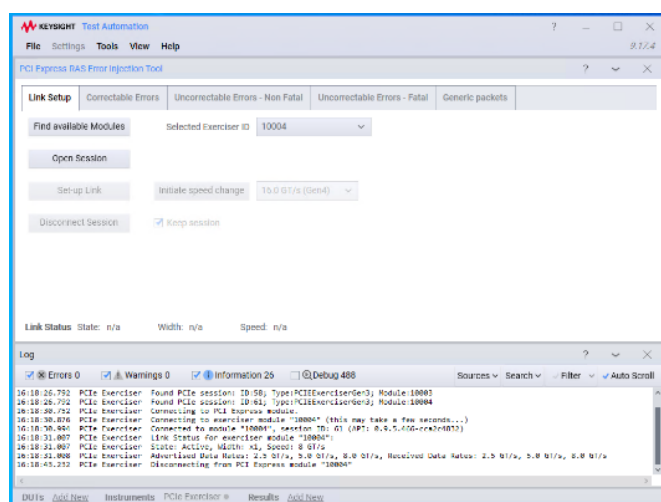


P5551PRAS PCI Express RAS

Reliability, Availability & Serviceability for PCIe 5.0

Introduction

RAS is an engineering term in computing that describes the robustness of server systems and mainframe computers. A computer build with high levels of RAS is more fault-tolerant, self-correcting when it discovers corrupted data and quick and easy to repair without disrupting operations. The concept of RAS is not confined to the computer hardware, but applies to the full system architecture, including e.g., protocol layers, BIOS, drivers and the operating system.



Product Overview

The Keysight PCIe 5.0 RAS test solution, together with the PCIe 5.0 Protocol Exerciser offers a complete RAS testing solution and platform in terms of Reliability, Availability and Serviceability validation.

Reliability indicates the probability that a system or software will produce accurate/correct results consistently, according to its specifications. Vendors can enhance reliability by adding features that help detect and repair problems in their products and adding failover mechanisms.

Availability indicates the probability that a system or software will be operational at any given time. Features that allow a system to function even when problems occur, instead of crashing, will enhance the product's availability.

Serviceability refers to the ease and speed with which a system can be fixed or maintained without disrupting operations.

Keysight's PCIe 5.0 RAS test solution, combined with Keysight's P5551A PCIe 5.0 Protocol Exerciser, completes the only RAS test solution available for PCIe 5.0 in the market.



Figure 1. P5551A PCIe 5.0 Protocol Exerciser

PCIe 5.0 RAS Injection Tool

The PCIe 5.0 RAS test solution is based on the P5551 PCIe 5.0 Protocol Exerciser that allows to generate complex PCIe error injection scenarios. To stress and validate the RAS features implemented in the system under test (SUT), the PCIe 5.0 protocol exerciser is plugged into a free PCIe slot in the SUT and connected via USB to the control PC running the exerciser firmware and PCIe 5.0 RAS test solution.

The RAS test solution provides an easy-to-use GUI with one-click operations to connect to the PCIe exerciser and configure the exerciser as PCIe endpoint (EP) device using the selected link settings. Finally, a large number of pre-defined PCIe error scenarios (see error categories listed below) can be injected into the SUT using single buttons.

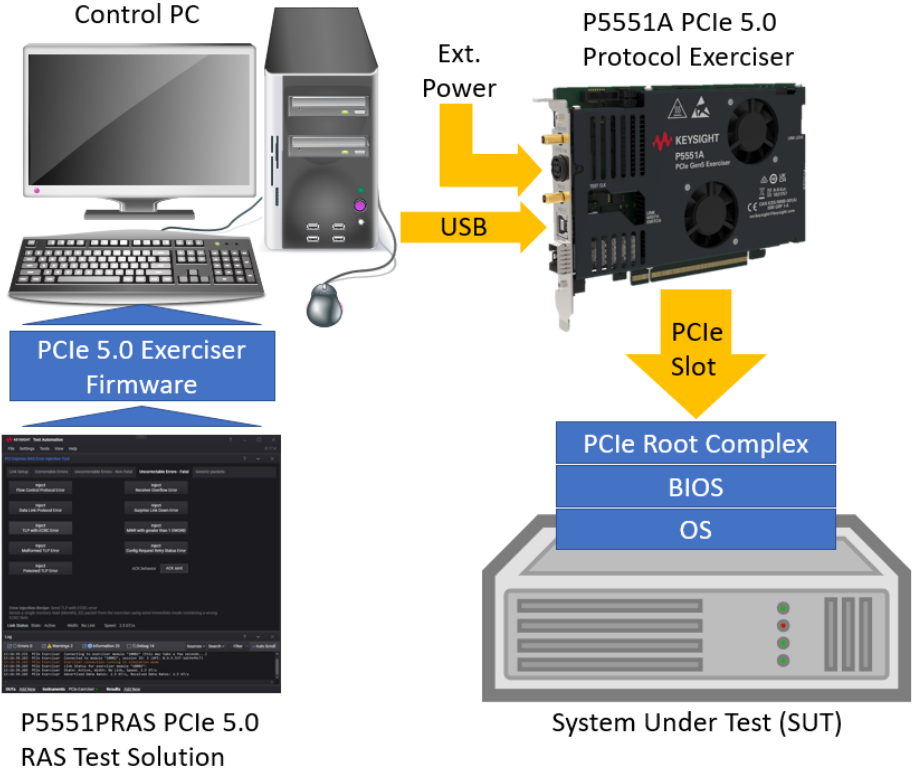


Figure 2. P5551A PCIe 5.0 Protocol Exerciser and P5551PRAS Test Solution

PCIe Error Types		
Correctable	Non-fatal	Fatal
Correctable errors	Uncorrectable errors	
<ul style="list-style-type: none"> • LCRC Error • Bad TLP • Bad TLLP • Replay timer time-out • Replay number rollover 	<ul style="list-style-type: none"> • Computer abort error • Unsupported request • Completion timeout • Unexpected completion • Replay number rollover • ACS violation 	<ul style="list-style-type: none"> • Flow control protocol • Data link protocol • ECRC error • Malformed TLP • Poisoned TLP • Receiver Overflow • Surprise link down • MWR greater than 1DW • Config Request Retry

Figure 3. Error categories covered

P5551PRAS GUI

The P5551PRAS GUI is based on Keysight's PathWave Test Automation Platform and is designed for intuitive and easy operation throughout the RAS validation process with PCIe 5.0 RAS.

- Link Setup
 - Find available modules (with selection of exerciser module)
 - Open Session
 - Set-up Link (with selection of link width)
 - Initiate speed change (with selection of data rate)
 - Disconnect session
- Correctable Errors
 - Inject TLP LCRC Error
 - Inject Bad TLP – Out of sequence Error
 - Inject Bad DLLP Error
 - Inject Replay Timer Timer-out Error
 - Inject Replay Number Rollover Error
- Uncorrectable Errors – Non Fatal
 - Inject Completer Abort Error
 - Inject Unsupported Request Error
 - Inject Completion Timeout Error
 - Inject Unexpected Completion Error
 - Inject ACS Violation Error
- Uncorrectable Error – Fatal
 - Inject Flow Control Protocol Error
 - Inject Data Link Protocol Error
 - Inject TLP with ECRC Error
 - Inject Malformed TLP Error
 - Inject Poisoned TLP Error
 - Inject Receiver Overflow Error
 - Inject Surprise Link Down Error
 - Inject MWR with greater than 1 DWORD
 - Inject Config Request Retry Status Error
 - ACK behavior: Inhibit / Enable ACK
- Generic packets
 - Send Memory Read Packet
 - Send Memory Write Packet

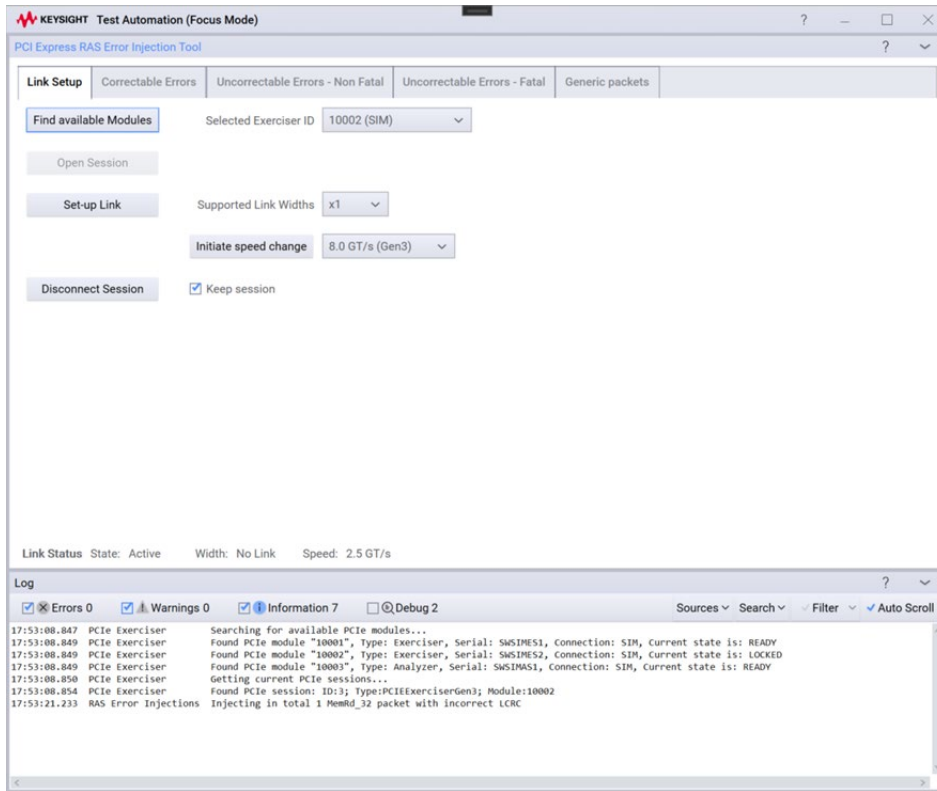


Figure 4. RAS GUI – Link Setup

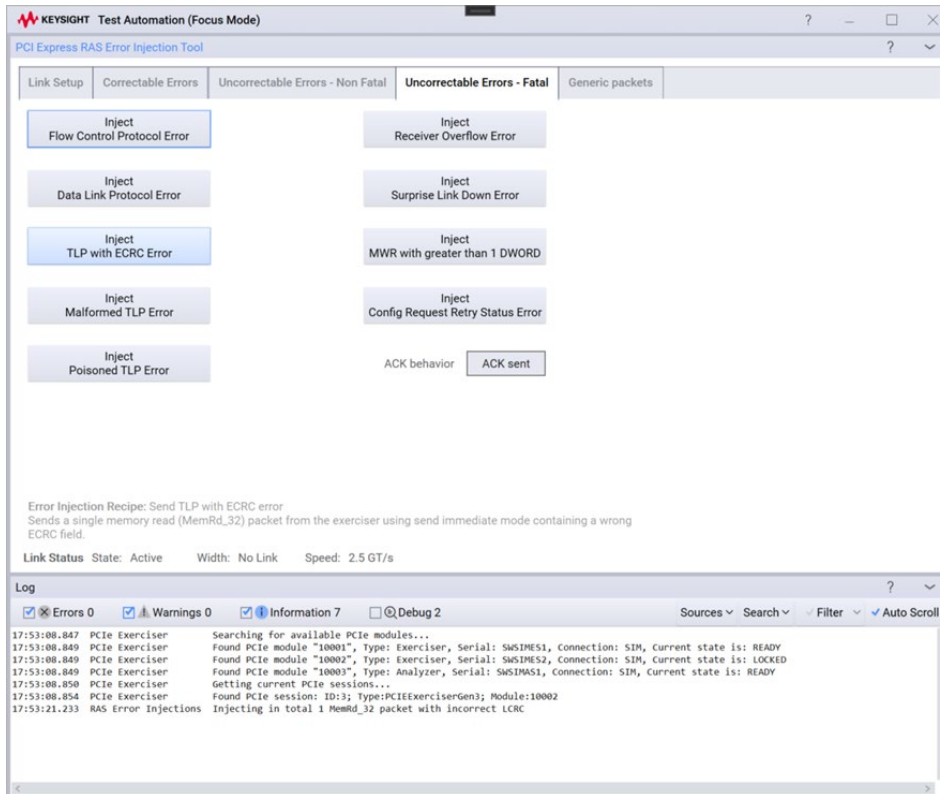


Figure 5. RAS GUI – Uncorrectable Errors – Fatal

Ordering Information

Model	Description	Comments
P5551PRAS	PCIe 5.0 RAS Injection Tool	
P5551A-E04	PCIe 5.0 Exerciser Linkwidth x4	Required
P5551PSWA	PCIe 5.0 Exerciser Software	Optional

Software Licensing and KeysightCare Software Support Subscriptions

Keysight offers a variety of licensing options to fit your needs and budget. Choose your license term, license type, and KeysightCare software support subscription.

KeysightCare software support subscriptions

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