Keysight Technologies Y1131A Verification/Diagnostic Software

Getting Started Guide

WARNING Under certain conditions, dangerous voltage levels capable of causing injury or death may remain even after external circuits have been disconnected. To avoid electrical shock, remove the main power cord from the 34980A and ensure all connections to the DUT, including field wiring to the instrument and the analog bus (if present) are deenergized and all circuits are discharged before coming in contact with the system. Ensure no hazardous voltages remain before connecting the Y1131A verification/diagnostic hardware.

The Keysight Y1131A Verification/Diagnostic Software provides a set of diagnostic tests for the relay switching modules available for the Keysight 34980A Multifunction Switch/Measure Unit. The software provides module-specific tests to assist you with troubleshooting possible relay failures and predicting system maintenance requirements. Custom terminal blocks are available to route signals and isolate individual relays for verification and diagnostics.

Additional Safety Notices

The following general safety precautions must be observed during all phases of operation of this instrument. Failure to comply with these precautions or with specific warnings or instructions elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Keysight Technologies assumes no liability of the customer's failure to comply with the requirements.

KEYSIGHT TECHNOLOGIES

WARNING Refer to the 34980A User's Guide before using the equipment. The 34980A User's Guide contains additional important information about the modules.

WARNING If this product is not used as specified in the operating instructions, the protection provided by the equipment could be impaired. This product must be used in a normal condition (in which all means for protection are intact) only. Any external connections must be made prior to applying power.

NOTE Pollution Degree 1: No pollution or only dry, non-conductive pollution occurs. The pollution has no influence (on insulation).

Pollution Degree 2: Normally only non-conductive pollution occurs. Occasionally, a temporary conductivity (leakage current between isolated conductors) caused by condensation can be expected.

WARNING Safety of any system incorporating the equipment is the responsibility of the assembler of the system.

WARNING Do not use the instrument if it is damaged. Before you use the instrument inspect all connections. Pay particular attention to the insulation surrounding connectors and / or cable assembly insulation. NEVER use a cable showing any signs of damage. Faulty cables can cause electrical shock and /or fire hazards and could lead to personal injury or death.

WARNING Dangerous voltage levels capable of causing death, may be present on a channel. Use extreme caution when handling and testing and adjusting this instrument. Any voltages greater than 30 Vrms, 42.4 Vpeak and 60 Vdc are considered hazardous (IEC 61010-1).

WARNING Keysight Customers utilizing the Open Platform Test Systems are classified as follows and require the user to have the appropriate skillset:

Operator: Interacts with the test system in a production environment, selection of test sequences, defining variables, running tests (test results, test statistics, control of marking devices)

Supervisor: Includes access to maintenance functions and utility sequences (control of hardline system functions, access to test area

Developer: Full access

WARNING The maximum common mode input to any one system component within the system installation is not to exceed the maximum stated ratings.

WARNING When interconnecting system components, the overall system maximum allowable input rating of the system would default to the lowest rating of any one system component.

WARNING Removal of the instrument's cover is to be conducted by qualified personnel only. Only qualified, trained personnel who are aware of the hazards involved should remove instrument covers. Prevent operators from accessing any external circuits, test fixtures, cables or wherever hazardous voltages may be present. Failure to recognize and observe normal safety precautions could result in personal injury or death.

WARNING This product is designed for use in INSTALLATION CATEGORY II and POLLUTION DEGREE 1 and 2 (See module specifications for ratings for each Pollution Degree environment).

WARNING High Energy Sources: The Analog Buses are designed to handle inputs up to their rated currents or their rated powers, whichever is less. Under certain fault conditions, high energy sources could provide substantially more current or power than the instrument can handle. It is important to provide external current limiting, such as fuses if the inputs are connected to high-energy sources. The overcurrent protection is to be rated for the maximum available short circuit current of the hazardous sources. Ensure that the current limiting devices / snubber circuits are appropriate for the signal being tested. Failure to do so may result in hazardous conditions such as fire or shock and could lead to personal injury or death.

WARNING Do not connect the Analog Buses directly to a mains power outlet. If it is necessary to measure a mains voltage or any circuit where a large inductive load may be switched, you must add signal conditioning elements to reduce the potential transients before they reach the Analog Buses. Refer to User's Guide for the maximum rated transients for each external source.

WARNING When working with dangerous voltage levels, intentionally closing of multiple bus and channel relays could cause a potentially lethal hazard on external connections. Use extreme caution when handling and testing and adjusting this instrument. Do not perform these procedures unless qualified to do so. Failure to recognize and observe normal safety precautions could result in personal injury or death.

WARNING No operator serviceable parts inside. Do not install substitute parts or perform any unauthorized modifications to the instrument. Return the instrument to Keysight for service and repair to ensure the safety features are maintained in operational condition. Instruments that appear damaged or defective should be made inoperative and secured against unintended operation.

WARNING To prevent electrical shock, disconnect the instrument from mains and external circuits before cleaning. Use a dry cloth or one slightly dampened with water (or 70% Isopropyl Alcohol) to clean the external case parts. Do not attempt to clean internally. Allow any moisture to evaporate prior to energizing the instrument.

WARNING ENVIRONMENTAL HEALTH & SAFETY: When any channel is connected to a hazardous voltage source, the instrument and the device under test should be supervised, following local EHS practices to restrict access.

Contents of Your Shipment

The following items are shipped with your Y1131A Verification/Diagnostic Software kit:

- Keysight Y1131A Getting Started Guide (this document)
- Keysight Y1131A Verification/Diagnostic Software, refer to www.keysight.com/find/software for the verification software installation.
- Optional Verification Terminal Blocks (required to run software):
  - Option 001: Terminal Block for 34921A, 34923A, and 34925 Multiplexer Modules
  - Option 002: Terminal Block for 34922A and 34924A Multiplexer Modules
  - Option 003: Terminal Block for 34931A, 34932A, and 34933A Matrix Modules
  - Option 004: Terminal Block for 34937A General-Purpose Switch Module
  - Option 005: Terminal Block for 34938A General-Purpose Switch Module

If you have questions about your shipment, or if you need information about warranty, service, or technical support, please contact Keysight Technologies:

In the United States: (800) 829-4444
In Europe: 31 20 547 2111
In Japan: 0120-421-345

Or, go to www.Keysight.com/find/assist for more information on contacting Keysight in your specific location. You can also contact your Keysight Technologies representative.

Software Installation

System Requirements:

– Microsoft Windows NT 4.0/2000/XP

– Adobe Acrobat Reader V5.0 or higher

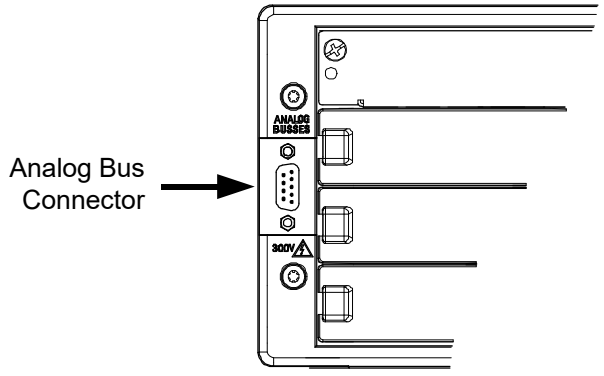
– Keysight IO Libraries Suite or equivalent

– Y1131A Verification Terminal Blocks

NOTE **If you have previously installed a version of the Y1131A software on your computer, be sure to remove that version before reinstalling the software. To remove the software, go to Control Panel | Add or Remove Programs and remove "Keysight 34980A Verification/Diagnostic Software".**

Hardware Installation

The Y1131A Verification/Diagnostic Software kit contains module-specific terminal blocks, which are used to route signals and isolate individual relays during the test. The verification terminal blocks connect to modules installed in the 34980A mainframe (for more information, see the Keysight 34980A Getting Started Guide). Each terminal block is pre-wired with a 9-pin ribbon cable terminated with a D-Sub connector. Prior to running a test, attach the terminal block to the desired module and connect the ribbon cable to the Analog Bus connector located on the 34980A's rear panel (see below).



WARNING To avoid electrical shock due to high voltages present on the Analog Buses, the software requires that all modules not under test be disconnected from the Analog Buses. With the verification terminal block connected to an installed module, all voltages present on the Analog Buses will also be present on the terminal block's D-Sub connector (located at the end of the ribbon cable).

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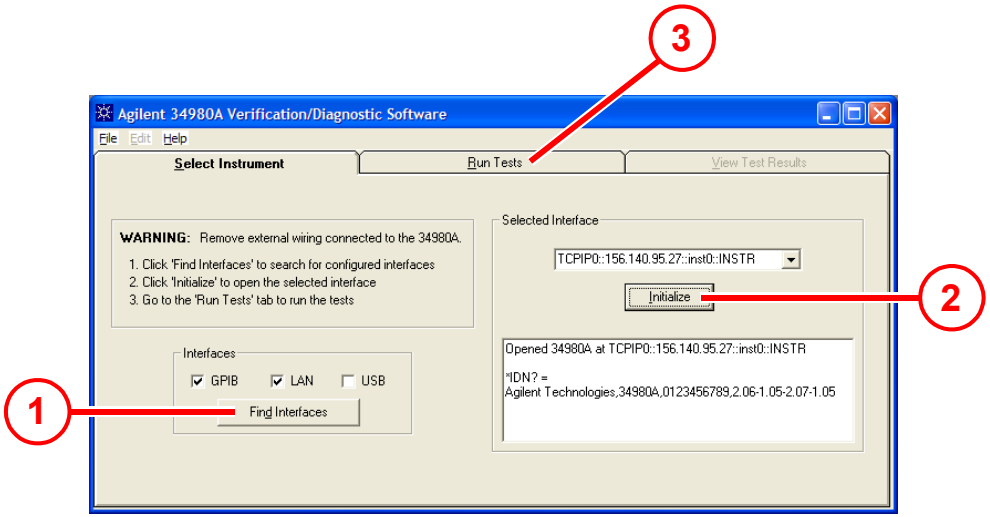
Establishing Connection to the Instrument

The 34980A supports GPIB, LAN, and USB interfaces. To establish a connection between the 34980A and your computer, you must have the desired interface properly configured (for more information, see the Keysight 34980A User's Guide). You must also have the proper interface cable connected between the 34980A and your computer.

The following steps show how to establish a connection over the desired interface from the "Select Instrument" tab.

1. Select the desired interfaces that you want to search and then click the "Find Interfaces" button.
2. The located interfaces are displayed in the drop-down list on the right side of the window. From the drop-down list, select the desired interface (or type the desired address) and then click the "Initialize" button. The software will attempt to connect to the selected interface and will then test the connection by sending the *IDN? command. The results are displayed in the status box.
3. After establishing a connection to your instrument over the desired interface, click the "Run Tests" tab to execute the diagnostic tests.



Executing the Diagnostic Tests

The diagnostic tests are performed on one slot at a time and require the use of the custom verification terminal blocks to route signals (the optional terminal blocks are listed on page 1). Prior to running a test, be sure to attach the terminal block to the module in the desired slot and connect the ribbon cable to the Analog Bus connector located on the 34980A's rear panel.

WARNING To avoid electrical shock, remove terminal blocks and external cabling from all modules not being tested prior to running any test procedures. In addition, since the software uses the Analog Buses to route signals to and from the module being tested, all external signals must be removed from the Analog Bus connector located on the 34980A's rear panel.

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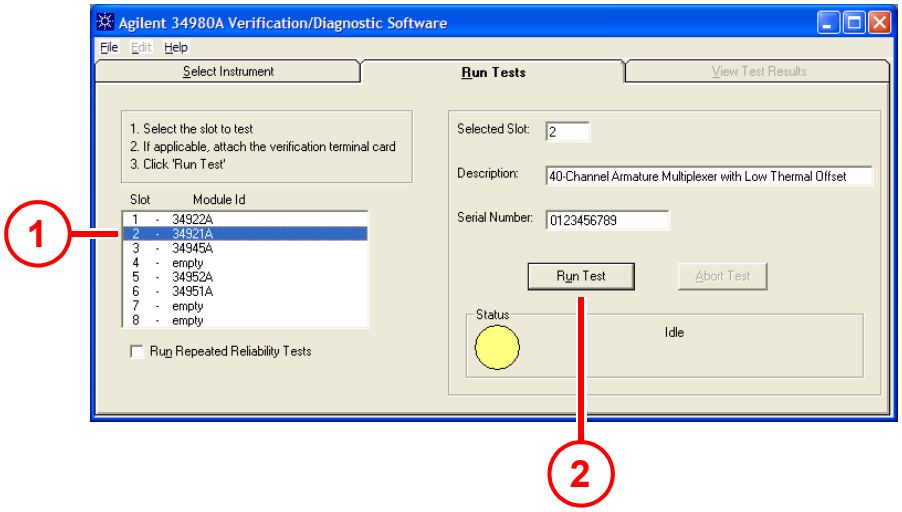
NOTE The Y1131A software provides a set of diagnostic tests for the 34980A's switching modules (see list of supported modules on page 1). Although the non-switching modules are not supported, the software will not generate an error and the test will return module identification information only.

The following steps show how to execute a test from the "Run Tests" tab.

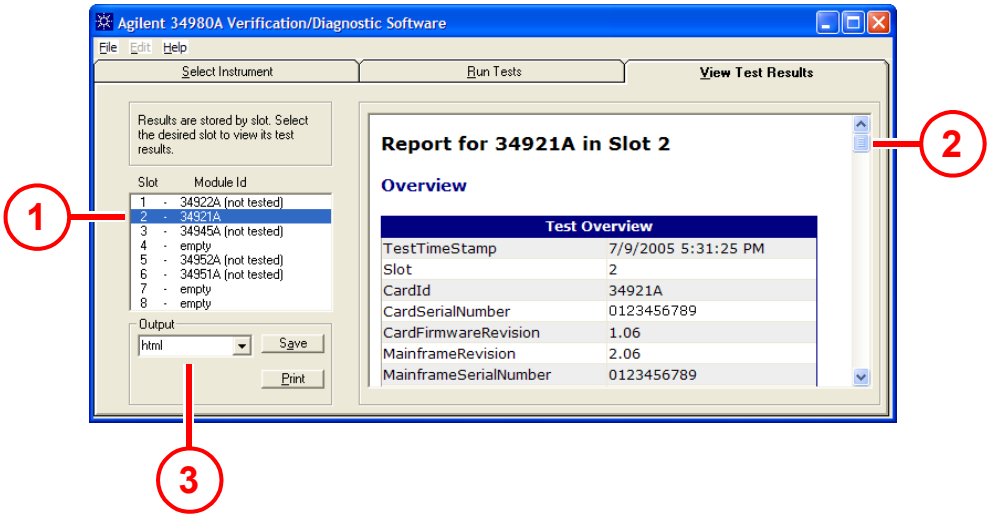
1. From the list on the left side of the window, select the desired module to test. Note that the module information shown on the right side of the window is updated for the selected slot. To run a repeated measurement of channel resistance, check the box for "Run Repeated Reliability Tests" located at the lower left corner of the window. The repeated measurements will fall within a certain standard deviation. As the standard deviation increases over time, this will be a good indication that the relay contact is aging.
2. After verifying that a terminal block is connected to the selected module, click the "Run Test" button. The test will begin immediately. The testing status is shown below the "Run Test" button. To stop a test in progress, click the "Abort Test" button.



Viewing the Test Results

The following steps show how to view the test results from the “View Test Results” tab. The test results are stored by slot.

1. From the list on the left side of the window, select the desired slot. Note that the test report shown on the right side of the window is updated for the selected slot.
2. Use the scroll bar to view the entire test report. You can also maximize the window if desired.
3. The test results are available in HTML or .CSV format. For either file format, you can print the report or save the information to a file.



NOTE One type of failure that may be reported is referred to as a single-sided short. A single-sided short refers to a differential channel on which one side of the differential relay is stuck closed. These shorts are difficult to detect since while in the differential mode an open will appear open and a short will appear as a short.

NOTE After running the diagnostic tests, be sure to reboot the 34980A to return the modules to a known state.

Channel Resistance Measurement Philosophy

For several of the relay switching modules, it is very difficult to isolate a particular channel. The Y1131A software, used in conjunction with the provided verification terminal blocks, attempts to isolate measurement channels in a repeatable manner. Although the absolute reported measurement of a channel may vary depending on your application or signal routing, the relative measurement with respect to the channel itself will be indicative of the actual variation in channel resistance over time.

As much as possible, the methodology used to measure channel resistance is noted in the test report generated by the software. In addition, we have provided

simplified block diagrams for all of the verification terminal blocks to help you better understand how specific channels are measured.

NOTE All multiplexer and matrix channels are measured differentially.

Module Verification Philosophy

The Y1131A software tests for the three primary types of relay failures: shorts, opens, and single-sided shorts on a differential channel. The degree to which these failures can be isolated to a particular channel depends on the methodology used to test the channel and number of relay failures on the module. Although the software attempts to isolate the particular failure, the primary intent is to give a pass/fail indication for future use.

NOTE All multiplexer and matrix channels are measured differentially.

Edition 4, Aug 2022

Printed in Malaysia

Y1131-90000

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