

# RI7100A Diagnose Procedure



**RI7100A RF ATE SYSTEM**

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# RI7100A Diagnose Procedure

## Plan for Diagnostics

Diagnostics can be run at any time the system functionality needs to be verified (like low yield issues), at scheduled intervals, and prior to planned Calibration. The frequency can be adapted by the end-user's discretion.

Review the [Requirements](#) and follow the [Prepare for Diagnostics](#) steps before performing Diagnostics.

The [Diagnose Procedure](#) can take approximately 20 minutes to complete, depending on frequency range (6 GHz ,12 GHz, or 20 GHz). Once the system is prepared, the diagnostics are run without user intervention, so the total time is not dependent on the responsiveness of the operator.

These instructions do not cover Fixture and DIB specific Diagnostics that can be created by the end-user. If any component is replaced, a targeted or full system Calibration is required. Please reference the "RI7100 Calibration Procedure" for more information.

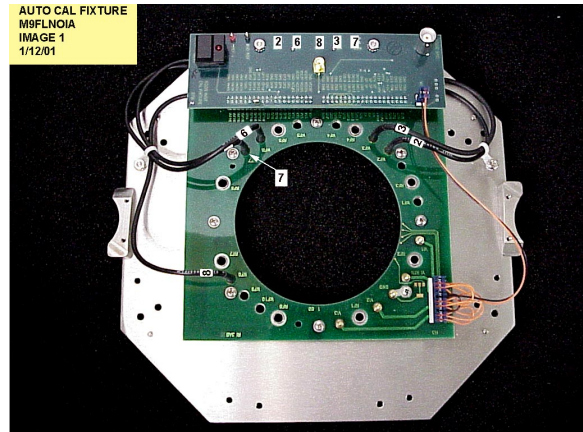
# RI7100A Diagnose Procedure

## Requirements

To diagnose a RI7100A system, the following items are needed:

- RI7100A Diagnostic/Calibration (Diag/Cal) Fixture
- Optional Tool: (facility provided)
  - SMA Torque Wrench

The RI7100A Diagnostic/Calibration (Diag/Cal) Fixture is included with delivery of a new RI7100A system. The Diag/Cal Fixture can be used on all RI7100A system configurations.



**RI7100A DIAG/CAL FIXTURE**

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### Optional Tool

A SMA Torque Wrench may be required to tighten SMA RF connections. The torque wrench should be set to 0.8-1.1 N·m or 7-10 in·lb.



**SMA TORQUE WRENCH**

*CAUTION: Over tightening a SMA connection could permanently damage the connector. Under tightening a SMA connection could cause measurement repeatability issues.*

*CAUTION: DO NOT use a wrench on the gold trim cap found on the SMA cables accessible from the rack's rear access door.*



**GOLD CAP ON SMA CABLES INSIDE RACK**

## RI7100A Diagnose Procedure

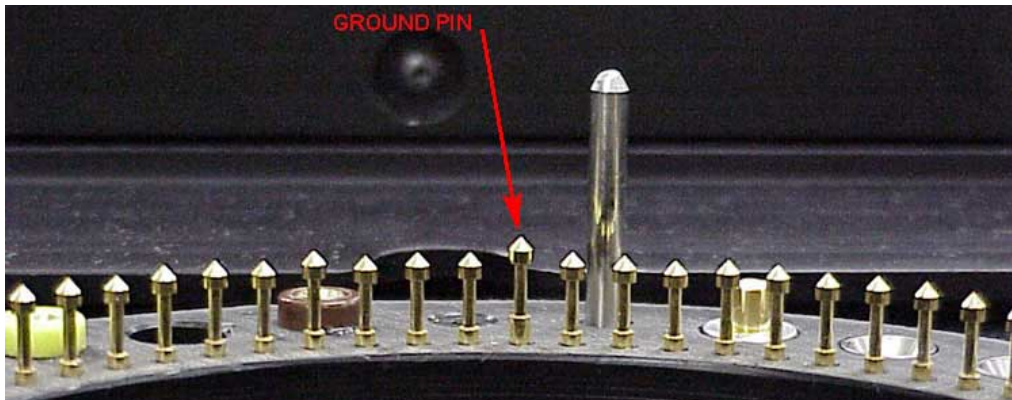
### Prepare for Diagnostics

Use the following procedure to prepare the system for Diagnostics:

1. If the RI RFIC Test Environment window is not already open, turn on the system's main power and monitor. Double click on the **RI System Software** icon on the desktop to open the RI RFIC Test Environment window.
2. Select **System > Login** from the menu and double click any user with "Admin" or higher privileges and enter the password. The currently active user icon will change to red, indicating it is active.
3. Close the Login window by pressing the X in the upper right corner or **Close** from the folder's key icon in the upper left corner.
4. Choose **System > Messages > Show** to open the Log window to display the messages displayed by the system. Leave this window open for the duration of the Diagnostics.
5. If a Fixture is attached, unlatch and remove from the test head.
6. Choose **System > Startup** to activate the latest tester configuration. The system will perform an internal self-test and leave all the instruments to their default idle state. The Log window will display "Fiber link connected and/or Hardware Mode" message after startup has finished.
7. If the Log window displays an Error or Warning message, please correct the problem before continuing. Inspect the "% Life Left" for the Testhead and for the Src12 instruments. If the reading is 25% or lower, consider replacing that relay.
8. It is OK to run Diagnostics before full warm up time is reached.

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9. Choose **Test > Tester** from the RI RFIC Test Environment window to open the Testers window.
10. From the Tester window, choose **Configure** from the right mouse button menu on the active (red) tester to open the Configuration window. Leave this window open for the duration of the Diagnostics.
11. Before connecting the Diag/Cal Fixture to the testhead, visually inspect the fixture and test head connectors. The RF connectors should be clean and the DC pogo pin heights should be aligned. (See [Measuring & Setting Pogo Pin Height https://roos.com/docs/JWAD-4W4U47](https://roos.com/docs/JWAD-4W4U47)). Inspect the Red/Black Ground, Ground Ref and VI 1, VI 2, and VI 3 connectors. Do not attach if any damaged pins are found.



12. Use the three (3) guide pins and orientation arrow in the testhead to align the RI7100A Cal Fixture with the testhead. Press the Cal Fixture downward onto the test head. Notify RI Support ([support@roos.com](mailto:support@roos.com)) if you have any missing guide pins.
13. Rotate the cam (locking) arms to hold the Fixture in place.
14. Choose **Test > Fixture** from the RI RFIC Test Environment window to and choose "Cal Fixture CF2" (or similar) to have the system load the Cal Fixture into the system configuration.

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15. The Fixture will appear as "*Fixture, <Cal Kit Name> Transient*" in the configuration window. If the configuration window is not already open, from the Tester window, choose **Configure** from the right mouse button menu on the active (red) tester.
16. Once the Fixture instrument are visible in the configuration window, continue on to the [Diagnose Procedure](#).

### Diagnose Procedure

Run the diagnostics to identify any possible failures or validate functionality. Contact RI Support ([support@roos.com](mailto:support@roos.com)) if any failures are encountered.

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To Open the Diagnostic Executive window:

1. Follow [Prepare for Diagnostics](#) steps.
2. From the RI RFIC Test Environment window, choose **Test > Testers** to open the Testers window.
3. Open the Diagnose Executive window by choosing **Diagnose** from the right mouse button menu from the Active (red) tester window.
4. Choose **Options > Show all results** to document the diagnostics.
5. Choose **Run > All** to execute each service plan listed in the Diagnostic executive. Each service test plan is described in the Diagnose Exec Testplans table below. The results will be displayed in the Log File window.

# RI7100A Diagnose Procedure

## Diagnose Exec Testplans

Testplans	Explanation
Ri7240-Diagnose Fixt Pwr C Bits CF2 Ri7420-Diagnose Vmeas CF2 Ri7430-Diagnose DB1-16 CF2 Ri7322-Verify Receiver RevE	<ul style="list-style-type: none"> <li>• Checks the fixture power and the C bits</li> <li>• Checks the voltage measurement (Vmeas) function</li> <li>• Checks that the static digital (DB lines) and the parametric measure are functioning.</li> <li>• Verifies receiver I/Q gain, IF gain, etc.</li> </ul> <p><i>NOTE: This “verify” will FAIL if out of cal. Any break in the RF path will cause FAIL.</i></p>
Ri7322-Diagnose Rec Filters Ri7322-Diagnose LNA IP3 20 Ri7240-Diagnose Noise Reference Ri7240-Diagnose Noise Source Ri7240-Diagnose Noise Floor 20	<ul style="list-style-type: none"> <li>• Checks the bandwidth and rejection of filters in the receiver</li> <li>• Measures receive path IP3.</li> </ul> <p><i>NOTE: FAIL on this test are path loss problems, not IP3 problems</i></p> <ul style="list-style-type: none"> <li>• Checks the internal noise reference</li> <li>• Checks the noise source and the noise receive path.</li> </ul> <p><i>NOTE: FAIL if receive path has too much loss.</i></p>



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Testplans	Explanation
Ri7240-Diagnose Ports 20 Ri7240-Diagnose Direct Receive Ri7240-Diagnose Receive Attenuation Ri7240-Diagnose Relays	<ul style="list-style-type: none"> <li>• Checks that signal is getting to the ports and that they are a good match</li> <li>• Checks that the direct receive paths are functional</li> <li>• Checks the receive attenuator's relative attenuation (receive attenuator is in the Testhead.)</li> <li>• Checks source/receive RF relays in Testhead (11, 12, 21, 22)</li> </ul>
Ri7240-Diagnose Source1 Ri7240-Diagnose Source2 Ri7240-Diagnose Source3 Ri7240-Diagnose Switch F Ri7240-Diagnose Switch G Ri7240-Diagnose Switch H Ri7240-Diagnose Switch I Ri7240-Diagnose Switch M	<ul style="list-style-type: none"> <li>• Checks the sources produce RF</li> <li>• Checks the coaxial switches in the Testhead for through loss and match</li> </ul>
Ri7269-Diagnose 1&2 Relays Ri7265-Diagnose Src3 Amp Module	<ul style="list-style-type: none"> <li>• Checks the Source 1/2 combiner module</li> <li>• Checks the Source 3 amp module</li> </ul>
Ri7420-VCC 123456 Verify CF2 Ri7430-Verify PowerVi1 CF2 Ri7430-Verify PowerVi2 CF2 Ri7430-Verify PowerVi3 CF2 Ri7710-Verify Lin Src1,2&3 Std 4Port	<ul style="list-style-type: none"> <li>• Verifies that the VCCs are operating</li> <li>• Verifies that the Power VI's are operating</li> <li>• Checks the sources for output power and linearity</li> </ul>



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Testplans	Explanation
Ri7240-RF2 Verify IM Internal 20 Ri7240-RF2 Verify IM Amp Internal Ri7240-RF2 Verify Src3 20 Ri7240-RF2 Verify Src3 Amp Ri7240-RF3 Verify IM Internal 20 Ri7240-RF3 Verify IM Amp Internal Ri7240-Rf4 & Rf5 Verify Internal Ri7240-RF6 Verify IM Internal 20	<ul style="list-style-type: none"> <li>• Verifies the test port paths</li> </ul>
Ri7240-EA Verify 20 Ri74103-Verify Digitizer CF2 Ri74103-Verify BER	<ul style="list-style-type: none"> <li>• Verifies the complex S-parameters are functioning</li> <li>• Verifies the digitizer (oscilloscope)</li> <li>• Verifies the bit error rate function is operating</li> </ul>

6. If all test plans report "Pass", then proceed with Production. If any "FAIL" results appear, choose **Save** from the Log File window and send the file to RI Support ([support@roos.com](mailto:support@roos.com)).