

Keysight N4917BACA 100G Optical Receiver Test Application

This document contains latest information on the Keysight N4917BACA 100G Optical Receiver Test Application.

Related Document

For detailed information, refer to the following document for this application:

- “Keysight_N4917BACA_UserGuide.pdf”

This document can be found at the following location after you install the application:

C:\Program Files\ Keysight\M8070A\Apps\N4917BACA\help

The M8070A/B documents can be located by clicking *Start > All Programs > Keysight M8070A/B > Keysight M8070A/B Documentation*. Alternatively, you can also visit

www.keysight.com/find/m8070b to find the latest versions of M8070A/B documents.

Installation Steps

To install the N4917BACA 100G Optical Receiver Test Application, perform the following steps:

1. Review the [System Requirements](#) for this application.
2. Download the installer file:
 - a. Go to the link: <http://www.keysight.com/find/N4917BACA>

- b. Click the **Technical Support** link on the right side of this page.
 - c. Select the **Drivers, Firmware & Software** tab.
 - d. Click the **N4917BACA 100G Optical Receiver Test** link and download the installer file.
3. In case IO Libraries Suite is not installed on your machine, download it from <http://www.keysight.com> before you proceed to installation of the N4917BACA software.
4. Double-click the downloaded installer file on your PC.
5. Please note that both Keysight License Manager 6 and Keysight License Manager 5 are installed on your system when you install N4917BACA software.
When prompted, install Keysight License Manager, if the same is not already available on your computer.
6. Follow and respond to the installer prompts.
7. Accept the terms of the Keysight Software End-User License Agreement and click Next.
8. Click Install.
9. Click Finish to finish the installation and exit the installation wizard.
10. Install the required licenses via the Keysight License Manager (if not done before). To know about the required licenses, refer to the User Guide.

Getting Started

To access the installed N4917BACA application, perform the following steps:

1. From the Start menu of the Windows Operating System, select All Programs > Keysight M8070A Applications > Keysight N4917BACA > Launch Keysight N4917BACA.
2. If you are launching the Keysight N4917BACA application for the first time, the End-User License Agreement window appears. Select Agree to continue.
The N4917BACA application banner is displayed.
3. If there is a single instance of the M8070A/B software running locally, the N4917BACA application launches after automatically getting connected to the M8070A/B software.
4. If the N4917BACA application does not detect any instance of the M8070A/B software running locally, the Connect to M8070 window appears.

5. When the application starts successfully, it will start with the default layout and will show the Set Up tab.

For more information on how to use the various features in the N4917BACA application, refer to the *Keysight N4917BACA 100G Optical Receiver Test Application Online Help*.

Keysight N4917BACA 100G Optical Receiver Test Application

Release V01.50.0003

Released Date	February 14, 2019
Operating System	Microsoft Windows 7 (64 bit) Microsoft Windows 8 (64 bit) Microsoft Windows 10 (64 bit)
Memory	8 GB RAM [minimum]
Display resolution	WXGA+ (1440 x 900) [minimum]
PC Interfaces	USB LAN GPIB (optional)
Instrument Firmware	M8040A BERT - M8070A/B System Software. For the supported versions see the <i>Software Pre-requisites</i> row. DCA-M/DCA-X - FlexDCA version A.06.01.68 or later 8164B LMS - Ver.V5.25 or later
BERT	M8040A-BU2 mainframe with USB option M8070A-OTP/ONP/1TP/1NP System Software. For the complete list of licenses, see Chapter 2 of the User Guide. M8045A-G32/OG3/OG4/801 High Performance BERT module M8057A Remote head for M8045A pattern generator, 1 channel M8046A-A32/801 Analyzer module
Signal Generator for Sinusoidal and Gaussian Noise Interference	M8195A-002/16G Arbitrary Waveform Generator or M8196A-002 Arbitrary Waveform Generator or 81150A-001 Pulse Function Arbitrary Noise Generator or 81160A-001 Pulse Function Arbitrary Generator N5171B-503 EXG X-series RF Analog Signal Generator
Lightwave Measurement System	8164B LMS Mainframe Tunable lasers 81602A-013 Tunable Laser 1250-1370 nm or 81606A-113 Tunable Laser 1240-1380 nm or 81608A-113 Tunable Laser 1240-1380 nm or 81609A-113 Tunable Laser 1240-1380 nm Reference Transmitters 81490A-E05 Reference Transmitter or 81490A-E09 Reference Transmitter or 81490A-E10 Reference Transmitter (multimode - for SR only) 81491A-085 Reference Transmitter (multimode - for SR only) 81491A-135 Reference Transmitter 81492A-E01 Reference Transmitter (56GBaud) 81000FI Optical Connector Interface

	81000NI Optical Connector Interface
	<p>Optical attenuators:</p> <p>81576A Attenuator module (straight SMF) or</p> <p>81577A Attenuator module (angled SMF) or</p> <p>N7761A external Attenuator (1 ch straight SMF) or</p> <p>N7762A external Attenuator (2 ch straight SMF) or</p> <p>N7764A external Attenuator (4 ch straight SMF)</p> <p>N7751A external Attenuator (1 ch with 2 optical power meter channels, SMF)</p> <p>N7752A external Attenuator (2 ch with 2 optical power meter channels, SMF)</p> <p>N7766A Optical Attenuator for Multimode Fiber (2ch)</p> <p>N7768A Optical Attenuator for Multimode Fiber (4ch)</p>
DCA-X Oscilloscope	<p>86100D-ETR/PTB/200/201/300/401 DCA-X mainframe</p> <p>86105D-281/IRC Electrical/Optical SMF module or</p> <p>86115D-282 /IRC Dual Optical SMF module</p> <p>86107A-020 Precision Time Base (not required, if DCA-X has the option -PTB)</p> <p>86115D-282/IRC</p> <p>Because of their low noise and superior speed, it is recommended to use DCA-M series oscilloscopes instead of DCA-X series oscilloscopes.</p>
DCA-M Oscilloscope	<p>N1092A one optical channel or</p> <p>N1092B two optical channels or</p> <p>N1092C one optical, two electrical channels or</p> <p>N1092D four optical channels or</p> <p>N1092E two optical, two electrical channels</p> <p>options LOJ/PLK/IRC/200/201/300/401/500</p>
Clock Recovery	N1077A-232/SMS/JSA Optical/Electrical Clock Recovery
Software Pre-requisites	<p>Keysight IO Library rev. 18.1 or above</p> <p>M8070B system software for M8000 series ver. 6.0.100.2 or later and</p> <p>M8070ADVB Advanced Measurement Package for M8000 series ver. 1.0.59.0</p> <p>OR</p> <p>M8070A system software for M8000 series ver. 5.1.50.2</p> <p>N1010A FlexDCA Remote Access System A.06.01.68 or later</p>
Application Requirements	<p>Keysight M8070A/B System Software. For the required licenses, see User Guide.</p> <p>Keysight M8045A with options G32 or G64; OG3 or UG3; OG4 or UG4; 801</p> <p>Keysight M8046A with options A32 or A64; 801</p> <p>Keysight N4917BACA 100G Optical Receiver Test Application. For the required licenses, see User Guide.</p>
File Name	SetupM80RxlEEE100G01500003.exe

Enhancements

- Support for automated optical stressed receiver sensitivity test for optical transceivers in a CPRI (Option 10) Fronthaul environment in compliance with the following standards:
 - o 100GBASE-LR4 (IEEE 802.3 2015 Clause 88)
 - o 100GBASE-ER4 (IEEE 802.3 2015 Clause 88)
 - o CPRI Specification V7.0

The CPRI-Option 10 standard has currently been implemented as an experimental feature only. For more details, get in contact with Keysight support.

- New licensing model. For details, refer to Chapter 2 of the *N4917BACA User Guide*.
- Support for new reference transmitters:
 - o 81491A-085 and 81491A-135
 - o 81492A-E01
- Support for new M8070B System Software for M8000 Series of BER Test Solutions. This also requires M8070ADVB Advanced Measurement Package for M8000 Series of BERT Test Solutions.
- Support of new firmware versions
 - o M8070B - 6.0.100.2
 - M8070ADVB Advanced Measurement Package for M8000 Series - 1.0.59.0
 - o M8070A - 5.1.50.2
 - o FlexDCA - A.06.01.68
- Full support for remote interface
- Improved organization of configuration parameters in logical groups
- Added several new configuration variables in “BERT Settings” to adjust ED and CDR settings for receiver testing.

Note: The new config variable “Jitter Tolerance CDR LBW Auto” is not listed yet in the user guide and remote guide. Use this variable to enable or disable the automatic loop bandwidth adjustment in case a clock data recovery (CDR) is used during jitter tolerance testing.

Fixed defects

- The connection diagrams now show the correct orientation and connection setting for the directional coupler used to combine the data pattern and the sinusoidal interference signal.
- Fixed a defect that caused BER results from the DUT control interface (DCI) to throw an error and abort the receiver test.
- Fixed the behavior of configuration variable “Stressed Eye Calibration Power Mode” setting “Max”. The attenuation should be set to 0dB now, in case the maximum output power does not exceed the specified abs. max. optical output power (which will limit the power in that case).
- Fixed a defect that caused an error when loading or saving test limit template files.
- Fixed a defect that caused empty entries for some configuration variables.
- Fixed a defect that caused the calibration to abort in some cases when taking a DCA screenshot.
- Fixed a defect that caused all tests to be available even in case of missing instrument connections after loading a saved project.

Known Issues

- Unexpected behavior might be observed when running the software and the software prerequisites on Windows 10 operating system. As a workaround, ensure that you install and run the N4917BACA application and the other software prerequisites as an administrator.

In scenarios where the user does not have administrator rights, the suggested workaround is to install the software and prerequisites as an administrator and enable full control (read, write access) **mandatorily** to the following folders:

- o C:\Program Files\Keysight\M8070A\Apps\N4917BACA
- o C:\ProgramData\Keysight\M8070A\Apps\N4917BACA
- o C:\ProgramData\Microsoft\Windows\Start Menu\Programs\Keysight M8070A Applications
- o C:\Users\Public\Documents\Keysight\M8070A\Apps\N4917BACA

and **preferably** to the following additional folders:

- o C:\Users*<user_name>*\Documents\Keysight\M8070A\Apps\N4917BACA

- C:\Users*<user_name>*\Documents\Keysight\M8070A\Apps\N4917BACA
- When an appended series of calibrations fail during the first trial, the results of successive trials will not be displayed in the *Results* tab even if these calibrations were successful. Restart the series in this case or use “Replace results” to overwrite the results of the previous runs.
- Depending on the targeted standard and particular HW configuration, a 6dB or 10dB attenuator might be required in the sinusoidal interference signal path. Use this approach when the calibration fails, and an error related to clipping of AWG amplitude is reported (Error message: *Set range clipped*).
- The TDEC verified by the software and the one displayed in eye-mode measurement of the FlexDCA software using default parameters are based on different OMA definitions, resulting in different TDEC values in presence of strong ISI. The value reported by the N4917BACA software is measured compliant to the method defined in the standards.
- In some of the scenarios that involve the use of an external CDR for transmission standards where its usage is optional, calibrations might lead to failing results.
- Laser safety errors are sometimes returned when the reference transmitter is calibrated, and an external TLS source is used. As a workaround restart the test task or reduce the maximum output power of the tunable laser (“Maximum TLS output Power” parameter in the Configure tab). Alternatively, toggle the “Switch off PG during REFTX recal” parameter in the Configure tab.
- When the Keysight N77xx Viewer software is connected via USB to a N77xx type attenuator which is also used by the N4917BACA application, time-out errors might occur. To prevent these errors during ORST testing, disconnect the N77xx Viewer software from the attenuator.
- In some non-EN-US locales, commas might be the preferred decimal mark instead of the decimal point. Similarly, use of digit group separators might be preferred in some locales. This might lead to misinterpretation of locale-specific formats when working with numeric values. While the N4917BACA application has some validation mechanisms to check for any confusion arising out of the non EN-US formats, it is best to avoid the use of locale-specific formats. Thus, use "point" as the decimal mark and avoid use of digit group separators.

Please contact Keysight Technical Support (www.keysight.com/find/supportrequest) if you encounter any other issue.

Release V01.00.0005

Released Date	July 19, 2018
Operating System	Microsoft Windows 7 (64 bit) Microsoft Windows 8 (64 bit) Microsoft Windows 10 (64 bit)
Memory	8 GB RAM [minimum]
Display resolution	WXGA+ (1440 x 900) [minimum]
PC Interfaces	USB LAN GPIB (optional)
Instrument Firmware	M8040A BERT - M8070A System Software 86100D DCA-M/DCA-X - FlexDCA version A.05.71 or later 8164B LMS - Ver.V5.25 or later 81490A Ref Tx - Ver.5.01 or later
BERT	M8040A-BU2 mainframe with USB option M8070A-0TP/ONP/1TP/1NP System Software M8045A-G32/OG3/OG4/801 High Performance BERT module M8057A Remote head for M8045A pattern generator, 1 channel M8046A-A32/801 Analyzer module
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	meter channels, SMF) N7752A external Attenuator (2 ch with 2 optical power meter channels, SMF) N7766A Optical Attenuator for Multimode Fiber (2ch) N7768A Optical Attenuator for Multimode Fiber (4ch)
DCA-X Oscilloscope	86100D-ETR/PTB/200/201/300/401 DCA-X mainframe 86105D-281/IRC Electrical/Optical SMF module or 86115D-282 /IRC Dual Optical SMF module 86107A-020 Precision Time Base (not required, if DCA-X has the option -PTB) 86115D-282/IRC
DCA-M Oscilloscope	N1092A one optical channel or N1092B two optical channels or N1092C one optical, two electrical channels or N1092D four optical channels or N1092E two optical, two electrical channels options LOJ/PLK/IRC/200/201/300/401/500
Clock Recovery	N1077A-232/SMS/JSA Optical/Electrical Clock Recovery
Software Pre-requisites	Keysight IO Library rev. 18.1 or above M8070A system software for M8000 series Ver. 4.0.100.2 or later N1010A FlexDCA Remote Access System A.05.71 or later
Application Requirements	Keysight M8070A System Software Version: 4.0.100.2 and above with options OTP Keysight M8045A with options G32 or G64; OG3 or UG3; OG4 or UG4; 801 Keysight M8046A with options A32 or A64; 801 Keysight N4917BACA 100G Optical Receiver Test Application N4917BACA-1TP or N4917BACA-1NP
File Name	SetupM80RxIEEE100G01000005.exe

Features

First release of Keysight N4917BACA 100G Optical Receiver Test Application. The application provides a platform for automated stressed receiver sensitivity test, which is compliant with the following IEEE standards and related Multi Source Agreements (MSA):

- 25GBASE-ER/-LR/-SR
- 100GBASE-LR4/-ER4/-SR4
- CLR4, CWDM4, 4WDM

The solution consists of several test instruments such as a Bit Error Rate Tester (BERT), an arbitrary waveform generator (AWG), Digital Sampling Scope (DCA), Optical Reference

Transmitter, Tunable Laser, and Optical Attenuator operating together with the N4917BACA software package.

Some salient features of the N4917BACA 100G Optical Receiver Test Application include:

- Remote control of all the test instrumentation
- Automated calibration of the optical stressed eye parameters (ER, VECP/SEC, OMA, J2, J4, and J9) following the procedure recommended by IEEE
- Adjustable target values for the above-mentioned metrics
- Automated Stress Receiver Sensitivity, jitter tolerance, and eye mask tests

Known Issues

- Remote Interface feature (View > Preference > Remote) is not officially supported. For instance, “Remote Interface Hint” (right click on “Tests” or “Utility Functions” in Select Tests” Tab) or the reference manual (Help > Automation > Remote Interface) are not final.
- When an appended series of calibrations fail during the first trial, the results of successive trials will not be displayed in the *Results* tab even if these calibrations were successful. Restart the series in this case or use “Replace results” to overwrite the results of the previous runs.
- Depending on the targeted standard and particular HW configuration, a 6dB or 10dB attenuator might be required in the sinusoidal interference signal path. Use this approach when the calibration fails, and an error related to clipping of AWG amplitude is reported (Error message: *Set range clipped*).
- The TDEC verified by the software and the one displayed in eye-mode measurement of the FlexDCA software using default parameters are based on different OMA definitions, resulting in different TDEC values in presence of strong ISI. The value reported by the N4917BACA software is measured compliant to the method defined in the standards.
- The external CDR is not supported for flavors where its usage is optional. Use a clean clock instead (e.g. from pattern generator).
- Laser safety errors are sometimes returned when the reference transmitter is calibrated, and an external TLS source is used. As a workaround restart the test task or reduce the maximum output power of the tunable laser (“Maximum TLS output Power” parameter in the configure tab).

Please contact Keysight Technical Support (www.keysight.com/find/supportrequest) if you encounter any other issue.

