Getting Started
with the
Agilent N4876A
28 Gb / s Multiplexer 2:1

You only need a few minutes to get started with the N4876A together with your Serial BERT N4903B.

This Getting Started Brochure helps you to quickly install and check the instrument.

If you need more detailed information on the N4876A, refer to the Online Help of your High-Performance Serial BERT N4903B. For more information, visit
www.agilent.com/find/jbert

The Help also offers printable versions of the User Guide and the Programming Guide.

Agilent Technologies

Notice

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ESD Sensitive Device

All front-panel connectors of N4876A are very sensitive to Electrostatic Discharge (ESD).
We urgently recommend to operate the instrument in an electrostatic safe environment.
There is a high risk of instrument damage causing expensive repairs when connecting a not fully discharged device or cable to a front-panel connectors or when touching a connector.
Please follow these instructions:
Before connecting any coaxial cable to the connectors, short the center and outer conductor with ground.
Before touching the front-panel connectors, discharge yourself by touching the properly grounded frame of the instrument.

Safety Summary

General Safety Precautions

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 elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument.

Agilent Technologies Inc. assumes no liability for the customer's failure to comply with these requirements.

Before operation, review the instrument and manual for safety markings and instructions. You must follow these to ensure safe operation and to maintain the instrument in safe condition.

General

This product is a Safety Class 1 instrument (provided with a protective earth terminal). The protective features of this product may be impaired if it is used in a manner not specified in the operation instructions.

All Light Emitting Diodes (LEDs) used in this product are Class 1 LEDs as per IEC 60825-1.

Instrument Markings

This product is marked with a warning symbol when it is necessary for the user to refer the instructions in the manual.

Environmental Conditions

This instrument is intended for indoor use in an installation category II, pollution degree 2 environment. It is designed to operate within a temperature range of 5 – 40 °C (40 – 105 °F) at a maximum relative humidity of 95% and at altitudes of up to 2000 meters.

Refer to the specifications tables for the ac mains voltage requirements and ambient operating temperature range.

Before Applying Power

Verify that all safety precautions are taken. The power cable inlet of the instrument serves as a device to disconnect from the mains in case of hazard. The instrument must be positioned so that the operator can easily access the power cable inlet. When the instrument is rack-mounted the rack must be provided with an easily accessible mains switch.

Ground the Instrument

To minimize shock hazard, the instrument chassis and cover must be connected to an electrical protective earth ground. The instrument must be connected to the ac power mains through a grounded power cable, with the ground wire firmly connected to an electrical ground (safety ground) at the power outlet. Any interruption of the protective (grounding) conductor or disconnection of the protective earth terminal will cause a potential shock hazard that could result in personal injury.

Do Not Operate in an Explosive Atmosphere

Do not operate the instrument in the presence of flammable gases or fumes.

Do Not Remove the Instrument Cover

Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made only by qualified personnel.
Instruments that appear damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by qualified service personnel.
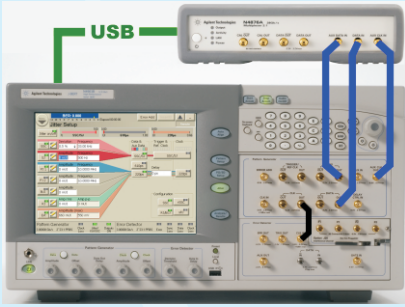
Services and Support

Installing the Agilent N4876A

Inspect Shipment

Check if the Agilent N4876A shipping container contains the following standard deliverables:

If the contents are incomplete, if there is mechanical damage, or if the instrument does not work within its specifications, notify the nearest Agilent office. The Agilent office will arrange for repair or replacement without awaiting settlement.

For the complete content of your delivery please refer to the Box Contents List.

In addition, the box will contain an installation media, 3 x 50 Ohm termination resistors, 3 x 3.5mm/2.4mm adapters, Certification of Calibration, UK6 report (test data sheet) and RoHS Addendum.

Agilent N4876A
28 Gb/s Multiplexer 2:1
connected to
N4903B Serial BERT

Box Contents List

Installation Media

Power Cable

USB Cable

Power Requirements

The instrument can operate from any single-phase AC power source supplying 100 – 240 V in the frequency range from 50 – 60 Hz.
The maximum allowed voltage fluctuation is 10%.
The maximum power consumption is 80 VA.
The power supply automatically adapts to the applied AC power (Auto Selection) and monitors the AC power range.

The mains plug can only be inserted in a socket outlet that provides protective earth contact. Any interruption of the protective earth contact inside or outside the instrument makes any operation of the instrument dangerous. Intentional interruption is prohibited.

If the N4876A is used with any other pattern generator, the alignment between clock and data inputs has to be adjusted manually.

Connections of the N4876A

The N4876A multiplexer doubles the pattern generator data rate by multiplexing two pattern generator channels. It extends the variable generator data rate of J-BERT N4903B up to 28.4 Gb/s and of ParBERT 81250A up to 27.0 Gb/s. The N4876A is controlled by the J-BERT N4903B via USB. The respective port is at the rear side of the instrument.

If the N4876A is used with other instruments like ParBERT 81250, see the *N4876A_User_Guide.pdf* contained in the *N4876A.x.x.x.zip* file located on the installation media. The following information is specific for use of the N4876A together with the J-BERT N4903B.

Its input *DATA IN* has to be connected to *DATA OUT* of the PG, *AUX DATA IN* to *AUX DATA OUT* of PG and *AUX CLK IN* to *AUX CLK OUT* of PG using the matched cable kit with the part number N4915A-011. Its Data Output has to be connected to the device under test.

The respective ports are at the front side of the instruments.

All data and clock input and output connectors of the PG that are not used in your test setup must be terminated with 50 Ohm.

Ventilation Requirements

Make sure that there is adequate clearance of 50 mm (2 in) at the rear and right side of the instrument to ensure adequate air flow. If the air flow is restricted, the internal operating temperature will be higher, reducing the instrument's reliability.

Do not cover the ventilation holes.

Installing the Agilent N4876A

Check the Software Status of your Serial BERT N4903B

1 You may wish to connect a keyboard and mouse to your Serial BERT N4903B. This is not mandatory but convenient and should be done when the instrument is switched off.

2 Switch on the Serial BERT N4903B.

3 Open the *Help* menu and click *About*.

The software revision must be 6.7 or later. If it is lower, you need to update the software. For details refer to the User Guide. *www.agilent.com/find/n4903*

4 Open the *Utility* menu and click *Minimize GUI*.

5 Inspect the *Agilent IO Control* icon in the Windows task bar.

If you see this icon, the revision of the Agilent IO Libraries Suite is 15.5 or later.


You can use the *Agilent Connection Expert* which makes it easy to configure USB instruments.

Installing the Agilent N4876A

Establish the USB Connection

1 Keep the user interface of the Serial BERT N4903B minimized.

2 Connect the N4876A to mains and switch it on.

3 Connect the USB cable between the USB port of the N4876A and one of the rear USB ports of your N4903B.

Rear panel view of N4903B

Rear panel view of N4876A
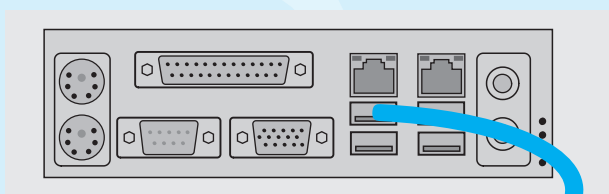
4 When you connect the N4876A for the first time, the Windows *Found New Hardware Wizard* appears and asks whether it should connect to *Windows Update*.

Answer *No*.

The necessary USB driver is part of the Agilent IO Libraries Suite.

5 Click *Next* until the wizard finishes.

Windows will automatically identify the N4876A as a *USB Test and Measurement Device*.

Assign a VISA Alias Name to the N4876A

A VISA alias name is required by the software to access the N4876A.
In this example, we use the *Agilent Connection Expert*. If your N4876A uses revision IO-Lib 15.5 of the Agilent IO Libraries Suite, you can run *IO Config* for the same purpose.

1 If the *Agilent Connection Expert* does not pop up automatically, click the *Agilent IO Control* icon in the Windows task bar and start it from the menu.
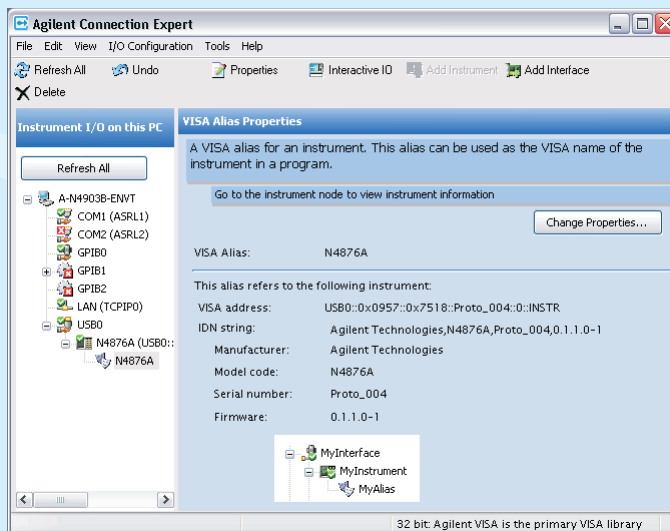
2 In the *Instrument I/O* panel, click *UsbInstrument1*. "UsbInstrument1" is the default alias name.

3 Click *Change Properties* and change the alias name to *N4876A*. This is the alias used by the software.

The alias name *N4876A* is mandatory. You should not use any other alias name.
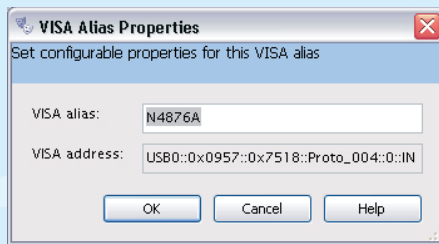
4 After clicking OK, the *Agilent Connection Expert* shows a window like the following:

Checking the Agilent N4876A

Connect the N4876A to the Pattern Generator

1 Disable the outputs of N4903B and use the cable kit to connect the pattern generator to the N4876A. Make sure to connect *DATA OUT* to *DATA IN, AUX DATA OUT* to *AUX DATA IN* and *AUX CLK OUT* to *AUX CLK IN*. Do not loop-in any other equipment (like N4903B's Option J20).

2 Mount the SMA 50 Ohm terminations on the unused *DATA OUT* and *AUX DATA OUT* ports of the pattern generator using the SMA to 2.4 mm adapters.

3 Restore the N4903B user interface from the Windows taskbar.

Enabling Multiplexer

1 From the Navigation Menu, select *External Instrument(s)* and then click *Config* to access *Config* window.
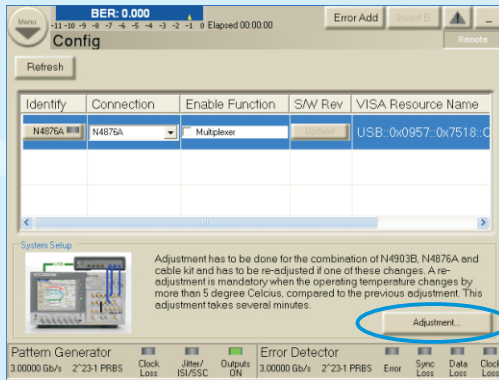
The *Config* window displays a list of instruments externally connected to the Serial BERT N4903B along with the functions associated with them.

If the setup is used for the first time, perform the Adjustment under System Setup. Refer to the online help for detailed Adjustment instructions and requirements when this has to be repeated.

Let's follow the next steps to enable these functions.

2 Select the *Multiplexer* function to open the *Multiplexer Connection* dialog.

3 Press *Enable* to activate the connection between the N4903B and the N4876B and also enables the output of the J-BERT.

A selected checkbox corresponding to the function indicates that the connection is established between the N4903B and N4876A.

Once you enable the *Multiplexer* function, a new menu entry is added to the *External Instrument(s)* submenu.

4 From the Navigation Menu, select *External Instrument(s)* and then click *Multiplexer (N4876A)* to access *Multiplexer (N4876A)* window.

5 You can set the value of *f/2 Jitter* between -10ps to +10ps.

Checking the Agilent N4876A

Check the Output Signal

The general approach shown here is using an oscilloscope.
If you have connected the N4876A to a High-Performance
Serial BERT N4903B, you can also use the error detector.
For details see the Help and the User Guide.

1 Preset Instrument state.

2 Enable *Multiplexer*
from the *Config* window.

3 In the *PG-Bit Rate Setup* window,
set Datarate to 3 Gb/s.

4 In the *PG Output Setup* window,
set the Data Offset to 0 V and
the Amplitude to 400 mV.

5 Connect the Outputs of the
N4876A to an oscilloscope.

6 Connect the Trigger Output
of the pattern generator to the
trigger input of the oscilloscope.

7 Set the Trigger Out to
Clock Output Divider 4.

8 Choose a suitable pattern
(e.g. PRBS) and start the
pattern generator.

9 After some adjustments of
the scope, you will see a
display like the following:

8

N4876-91010