

# Keysight Technologies W2641B DisplayPort Test Point Access Adapter

Data Sheet



Connect to your DisplayPort device to make physical layer parametric measurements

Emerging standards for consumer electronic devices and entertainment equipment provide for higher screen resolutions than ever before, which meets the market need for the highest computer monitor viewing quality possible. High screen resolutions necessitate higher link rates which place new demands on the source, sink and media such as cable or PC boards. This electrical signal environment makes measurement of physical layer parameters even more important and at the same time, more difficult. The Keysight Technologies, Inc. W2641B DisplayPort test point access adapter provides unrivaled convenience and performance.

## DisplayPort standard

The evolution of the DisplayPort standard, sponsored by VESA<sup>1</sup>, was driven by demand for higher-resolution and less-expensive computer displays. Computer industry insiders have long believed that the industry would ultimately shift to all digital flat-panel displays, and DisplayPort is the digital transport interface standard that finally promises to supplant the popular VGA CRT monitor. The low-profile DisplayPort connector is ideal for crowded back panels, motherboard designs able to drive multiple monitors, and portable equipment that offers uncompromised viewing. The DisplayPort connector has been designed to support the high DisplayPort bit rates now and in the future. It

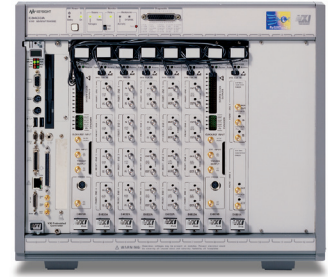
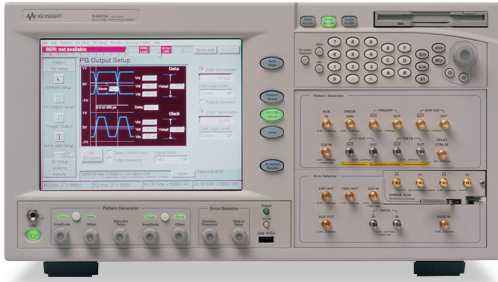
is likely that DisplayPort will become the primary video interface for desktop and laptop personal computers, and it may ultimately be used in consumer electronics equipment such as televisions and DVD players.

The DisplayPort standard covers a wide range of screen resolutions and physical configurations. It outlines tests for the high-speed digital signals for source and sink testing, low-frequency control path (the AUX channel), link layer and protocol verification such as HDCP (high bandwidth content protection) and media evaluation.

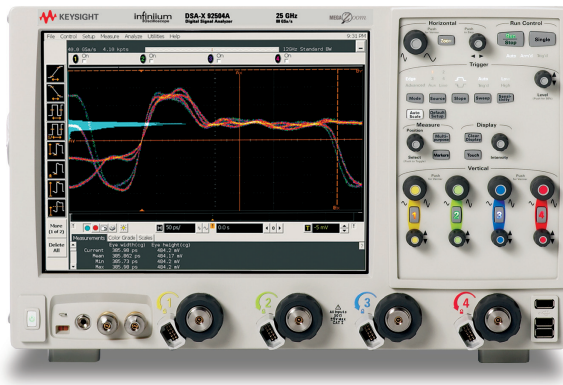
1. Video Electronics Standards Association ([www.vesa.org](http://www.vesa.org))

## Test point access adapters

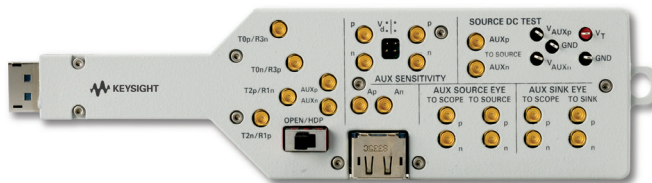
Test point access adapters (TPA) should be as transparent as possible to each measurement, connect to a wide range of test product form factors, and have the flexibility to measure several parameters. The W2641B TPAs have low loss that is well characterized versus frequency, and very good impedance characteristics and low intra-pair and inter-pair skew to provide the high signal fidelity connection required. These TPAs have been designed to conveniently connect to DisplayPort receptacles without obstructing cables or presenting a footprint near the device under test greater than the DisplayPort receptacle connector itself. W2641B DisplayPort test point access adapters provide the performance and flexibility you need to accurately evaluate DisplayPort sink source devices.



Pair a W2641B TPA with an Keysight N4903B J-BERT or E4887A ParBERT (81250) for DisplayPort sink validation.



Use an Keysight Infiniium DSO90000 or DSOX90000 Series oscilloscope with a W2641B TPA for DisplayPort source validation.



The W2641B DisplayPort test point access adapter

## DisplayPort source testing

The DisplayPort Physical Layer Compliance Test Specification (CTS) covers source tests such as level verification, pre-emphasis level, skew, jitter, data eye, transition time and many other parameters. When you pair W2641B TPAs with Keysight's Infiniium 90000 or 90000 X-Series oscilloscopes and the U7232A DisplayPort compliance test software, you will have uncompromised accuracy and unrivaled simplicity in characterizing your source design. The TPA's excellent performance enables you to clearly see nuances in the transmitted pattern and determine how to improve the performance of the source and channel. The U7232A DisplayPort compliance test software automates measurements of the multitude of parameter configurations possible in DisplayPort devices and provides you with an extensive report on how the devices have performed. The U7232A is designed for use in validation and compliance labs so you can use the full measurement suite before you submit your devices to a DisplayPort Authorized Test Center for certification to make sure you've taken care of problems in advance.

## DisplayPort AUX channel testing

The DisplayPort specification includes a special channel, the AUX channel, which is used to dynamically coordinate the link source and sink. The W2641B exposes this differential lane that operates at 1 Mbs (DisplayPort 1.1a) and also provides five other fixture sections to enable the testing of AUX that was newly added in DisplayPort CTS 1.1a. The five sections are connected through snap-in SMP connectors and cover:

- AUX line impedance verification for source (CTS 1.1a tests 3.18 and 3.19)
- Differential probing while connected in a real line for signal evaluation (AUX channel Eye CTS 1.1a 8.1 and sensitivity evaluations CTS 1.1a test 8.2)
- Automation connection through an additional DisplayPort receptacle connector for cable connection to a source or sink device (for unattended automatic testing using the W2642A Displayport AUX channel controller)
- Source eye connection where sink termination is emulated (enables analysis directly connected to an oscilloscope)
- Sink eye connection where source termination is emulated (enables analysis directly connected to an oscilloscope)

## DisplayPort sink testing

The DisplayPort Physical Layer Compliance Test Specification stipulates a receiver tolerance test regimen where the digital data is transmitted with phase jitter having sinusoidal and random characteristics, as well as a calibrated channel degradation (called intersymbol interference, or ISI). The signal parameters, such as jitter quantity and level, vary according to the bit rate being tested. These signals can be injected to a DisplayPort sink from Keysight sources such as the N4903B JBERT and the 81250 ParBERT through the W2641B.

For the calibration of the sink test setup, a complementary receptacle test fixture is needed. This is available as a third party product BIT-DP-RTF-0001 from BitifEye Digital Test Solutions, (see [www.bitifeye.com](http://www.bitifeye.com)). The same product is needed for testing so-called tethered devices, i.e. devices such as monitors with DisplayPort cables inseparably connected to them. To facilitate automated measurements and process control, the N5990A test automation software platform offers automated DisplayPort compliance and characterization tests.

## DisplayPort device connection

The W2641B connects directly into a DisplayPort receptacle connector such as found on graphic cards, motherboards and on PCs. The fixture was designed to reduce possibility of interference to other connectors and cable types. Even so, there are always connection configurations where interference is seen or where perpendicular entry to the W2641B is inconvenient or impossible. To address some of these conditions, the W2641B DisplayPort Adapter fixture now comes standard with right-angle SMP cables. These are phase matched to less than 2ps and have superior impedance and loss characteristics.

## W2641B test accessories

Model number	Description	Quantity
N5460A	Phase matched pairs: right-angle SMP to SMA male (standard replacement cables)	1
E4809-23801	Cable plug-in tool (standard replacement)	1
E4809-23802	Cable removal tool (standard replacement)	1

## Test accessories

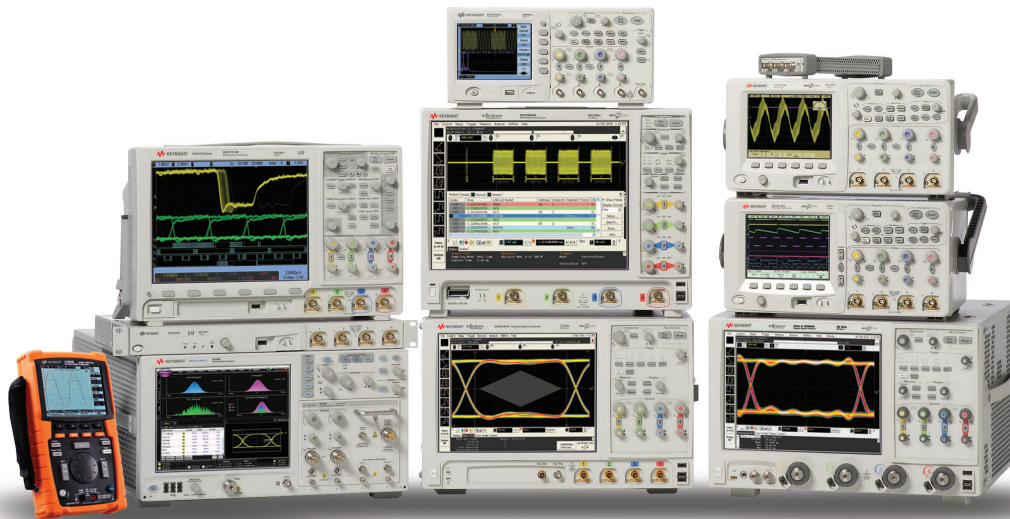
Model number	Description
11667B	Power splitter, DC to 26.5 GHz, 3.5-mm (f) connectors
11636B	Power divider, DC to 26.5 GHz, 3.5-mm (f) connectors
8493B	Coaxial attenuator (3, 6, 10, 20 or 30 dB), DC to 18 GHz, SMA connector
SA6-XX	Coaxial attenuators for AUX channel testing (Fairview Microwave) (XX refers to dB of attenuation)
1250-1158	SMA (f - f) adapter, DC to 18 GHz
1250-1159	SMA (m - m) adapter, DC to 18 GHz
1250-1397	Right-angle adapter, SMA (m - m)
1250-1741	Right-angle adapter, SMA (f - m)
1250-1698	SMA tee adapter (m, f, f), DC to 12.4 GHz
1250-1694	SMA (m) to SMA (f) Adapter
15442A	Cable kit, four 90-cm (36-inch) SMA (m - m) cables
15443A	Matched cable pair, two 90-cm (36-inch) SMA (m - m) cables, propagation delay within 25 ps
1810-0118	SMA (m) 50 $\Omega$ termination
33SMA-Q50-0-4	SMA push-on adaptors from S.M. Electronics (or equivalent)

## Related literature

Publication title	Publication type	Publication number
<i>Infiniium 90000 Series Oscilloscopes and 1160 Series Probes</i>	Data Sheet	5989-7819EN
<i>U7232A DisplayPort Compliance Test Software</i>	Data Sheet	5989-7198EN
<i>Keysight method of implementation for DisplayPort sink compliance test</i>	Application Note	5989-9147EN
<i>N4903A JBERT</i>	Data Sheet	5989-2899EN
<i>N4915A-006 DisplayPort ISI generator</i>	Data Sheet	5989-8688EN
<i>ParBERT TMDS generator</i>	Data Sheet	5989-5537EN
<i>N5990A Test automation software</i>	Data Sheet	5989-5483EN
<i>Infiniium 90000 X-Series oscilloscopes</i>	Data sheet	5990-5271EN
<i>86100D Technical Specifications</i>	Data sheet	5990-5824EN

## Product web site

For the most up-to-date and complete application and product information, please visit our product Web site at: [www.keysight.com/find/scope-apps](http://www.keysight.com/find/scope-apps)



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