

WaveLink Differential Probe System (4 GHz–6 GHz)

Key Features

4 GHz or 6 GHz models

Up to 5 Vpk-pk dynamic range with low noise

±3 V offset range

Ideal for DDR2, LPDDR2, DDR3

Innovative QuickLink architecture

Wide variety of tips and leads

- Solder-In Lead
- QuickLink Solder-In Lead
- Positioner (Browser) Tip
- Adjustable (Browser) Tip
- Quick Connect Lead
- Square Pin Lead
- Hi-Temp Solder-In Lead

Low loading and high impedance for minimal signal disturbance

Deluxe soft carrying case



The WaveLink Differential Probe Series is a 4-6 GHz bandwidth active differential probe series with the widest range of tips, large offset capability, and high dynamic range.

General Purpose Probe with Range of Capabilities

Teledyne LeCroy's WaveLink 4-6 GHz Differential Probes are a general purpose probing solution with high-input dynamic range and offset range capability. The range of capabilities is ideal for a variety of high-speed DDR signals where high dynamic range and large offset requirements are common.

Wide Variety of Tip and Leads

The wide variety of tips offered with the D4x0/D6x0 provides confidence that the most challenging test points can be probed. With seven different tips available, the D4x0/D6x0 provides great flexibility when probing, while maintaining signal integrity. An assortment of hands-free probe holders eases the challenge of connecting multiple leads to a board.

Exceptional Waveform Fidelity

WaveLink probes provide superior loading characteristics and are calibrated with a custom "fine-tuned" frequency response. The ultra-low loading coupled with a flat frequency response ensure accurate measurements.

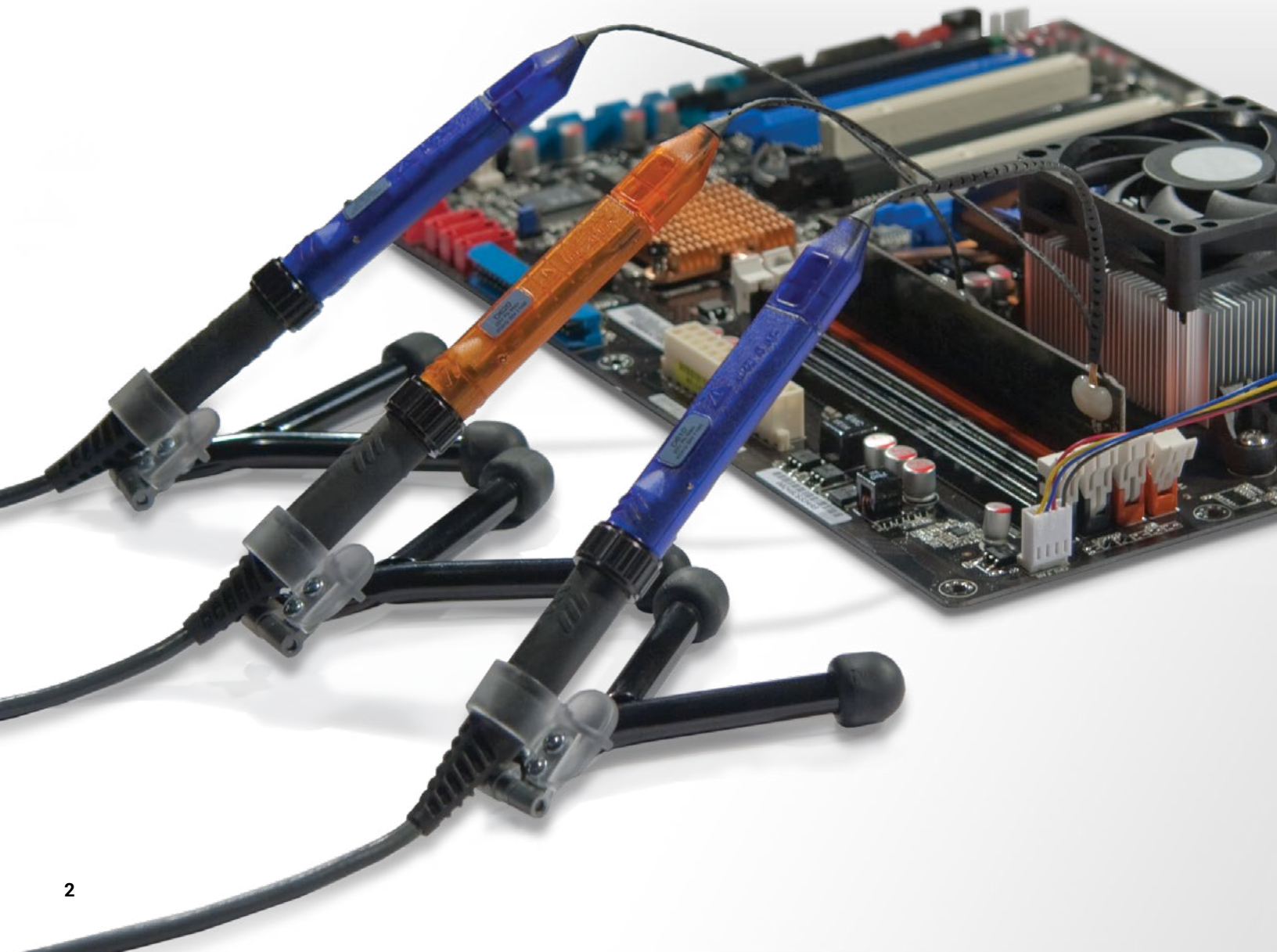
Unique QuickLink Architecture

The unique QuickLink architecture allows for probe tips to be quickly attached or removed to a WaveLink differential amplifier. Unlike other "consumable" probe tip solutions which rely on tiny, delicate tips located very close to the Device Under Test (DUT), the QuickLink Solder-In tip has an integral 9-inch lead. QuickLink Solder-In tips are low cost, making it easy to equip multiple test points and DUTs and eliminating time-consuming resoldering of connectors.

EXCEPTIONAL WAVEFORM FIDELITY

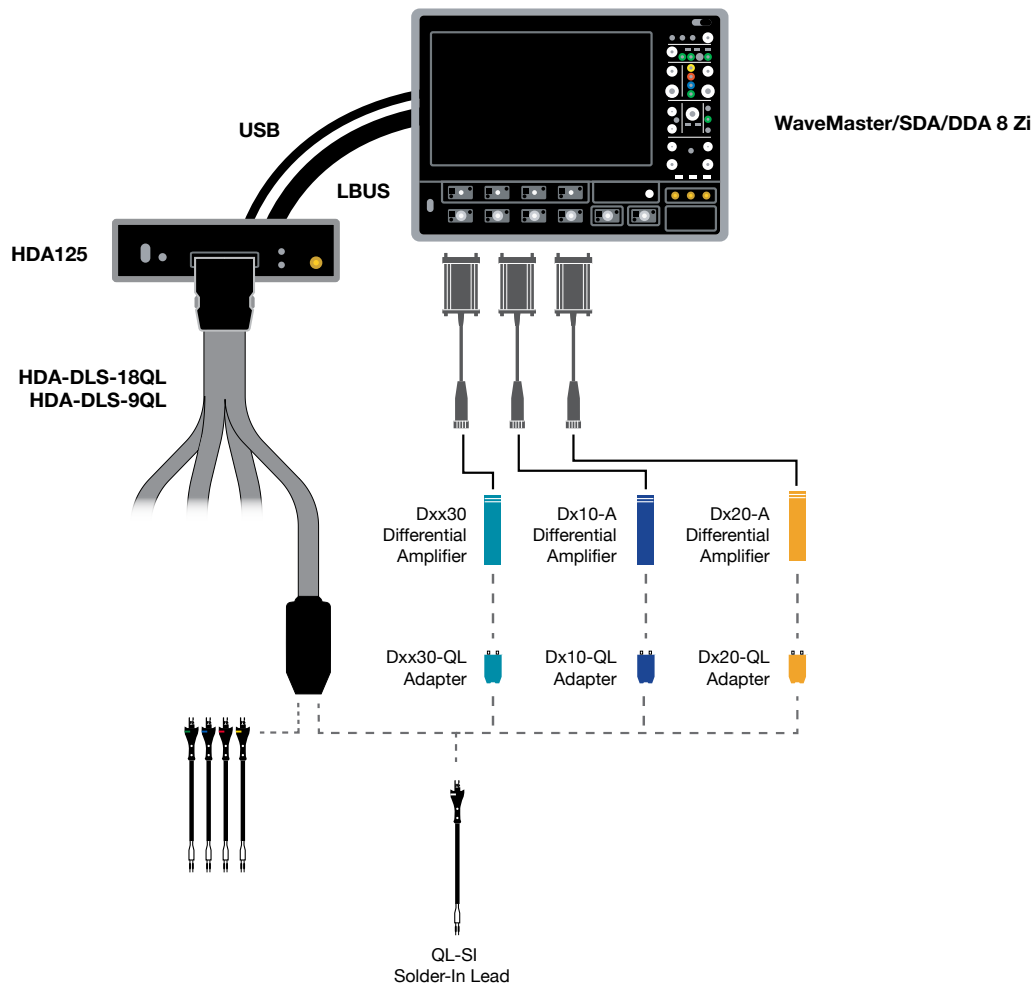
The D4x0/D6x0 probe series has superior electrical characteristics, providing excellent signal fidelity. These probes were designed with low loading and high impedance for minimal signal disturbance and circuit loading. WaveLink probes use a unique calibration process where each probe is programmed with a custom “fine-tuned” frequency response which is read by the oscilloscope in order to digitally compensate for the entire system response.

In addition to their electrical performance, WaveLink probes have the best-in-class mechanical design for optimum utility. The D4x0/D6x0 probes series includes seven different interconnect configurations allowing for flexibility when making measurements. Additionally, WaveLink probes offer a variety of hands free positioners to offer stable and accurate probe tip placement to make perfect contact without the worry of hand probing errors.



INNOVATIVE QUICKLINK ARCHITECTURE

The QuickLink probe tip system was designed from the ground up to be compatible with both the HDA125 High-speed Digital Analyzer system, and with Teledyne LeCroy's WaveLink series of differential analog probes. This cross-connection ability allows you to equip your system under test with QuickLink tips at all desired test points, and swap connections between digital and analog acquisition systems as needed.



High Signal Fidelity

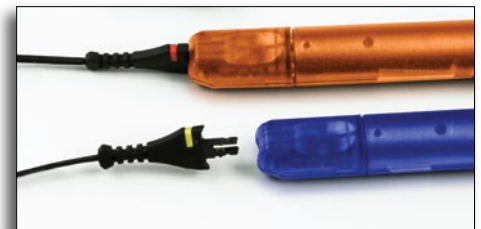
When connected to a WaveLink analog probe, QuickLink tips provide 8 GHz of bandwidth and a flat, well-controlled frequency response. When used for digital acquisitions with the HDA125, they support 3 GHz bandwidth with industry-leading sensitivity. In both cases, high input impedance ensures minimal loading of the system under test.

Easy to connect

Unlike other "consumable" probe tip solutions which rely on tiny, delicate tips located very close to the device under test, the QuickLink solder-in tip has an integral 9-inch lead. This effectively relocates your test point to a more convenient location, making testing more reliable by eliminating torque and other forces on the solder joints.

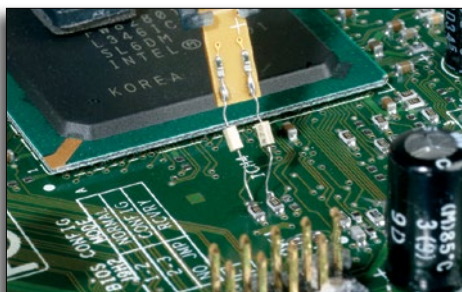
Cost-effective

QuickLink solder-in tips are low-cost, making it easy to equip multiple test points and DUTs, and eliminating time-consuming re-soldering of connectors.



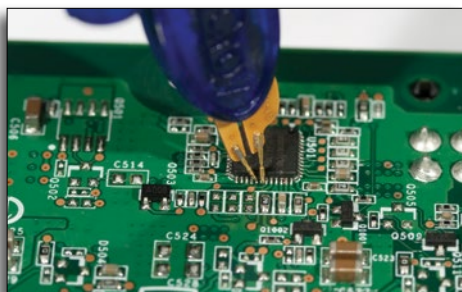
WIDE VARIETY OF TIPS AND LEADS

Offering seven different tips and leads, the D4x0/D6x0 probe series provides confidence that the most challenging test points can be probed. In addition to the various tips, an assortment of hands-free probe holders are provided to ease the challenge of connecting multiple leads to a board.



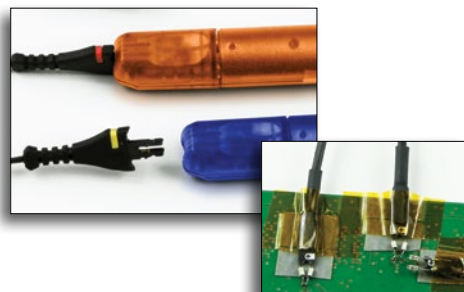
Solder-In Lead (SI)

The Solder-In interconnect lead features the smallest physical tip size of any high bandwidth differential probe and the highest level of electrical performance. Two very small damping resistors are directly soldered into the connect points for the highest impedance and lowest tip inductance. The resistors have highly flexible leads allowing connection to input points with a wide range of input spacing.



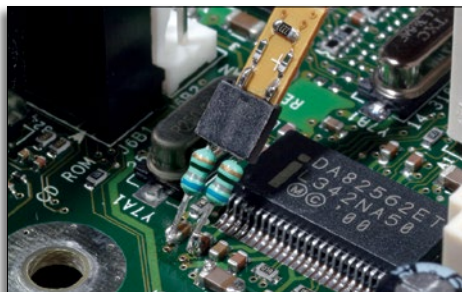
Positioner Tip (PT)

The PT positioner tips provides spring loaded leads to allow for easy probing. The adjustable wheel allows for precise probing, allowing a spread up to 0.14". The small form factor provides a convenient grip for hand probing, or use the wand or XYZ positioner for more precise placement.



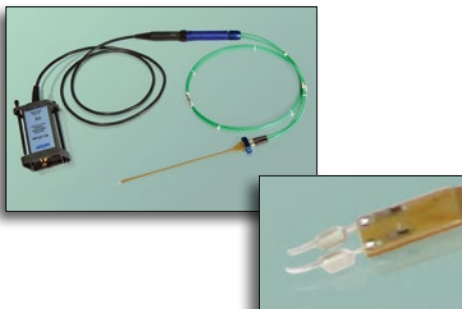
QuickLink Solder-In Lead (QL-SI)

The unique QuickLink architecture allows for probe tips to be quickly attached or removed to a WaveLink differential amplifier. The ultra low loading design allows for unused tips to remain attached to the DUT without impacting the signal fidelity.



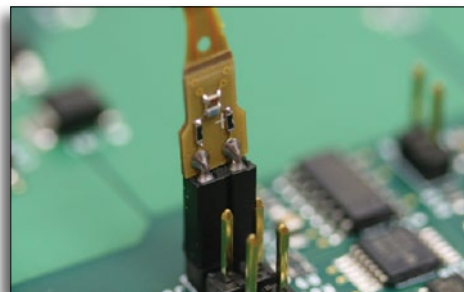
Quick Connect (QC)

The Quick Connect interconnect lead enables the probe to be quickly moved between multiple test points on the test circuit. Just solder a pair of ledged damping resistors at each location where interconnection is required. A small connector mounted on the probe tip plugs into the damping resistors, enabling a quick connection between sets of test points.



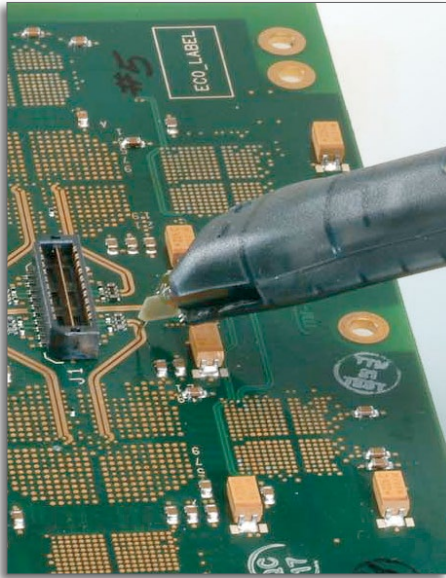
High Temperature (HiTemp) Cables and Solder-In Lead

The 90 cm HiTemp cables and Solder-In lead can be used for controlled situations where the differential amplifier module needs to be removed from the extreme temperature environment. Ideally suited for testing scenarios where the temperature can fluctuate from -40 °C to +105 °C.



Square Pin (SP)

Many applications, such as IC characterization boards, use standard 0.025" square pins for interconnect. The Square Pin interconnect lead directly mates with a pair of 0.025" (0.635 mm) square pins that are mounted on standard 0.100" (2.54 mm) centers.



WaveLink Differential Amplifier Modules with Adjustable Tip (-AT)

WaveLink adjustable tip probes are designed to provide an optimum mechanical connection for signal measurement.

- Built-in thumbwheel for precise positioning of tip — stays put after adjustment
- Maintains sharp points for good contact
- Tips made of “NiTiNOL,” a super-elastic nickel-titanium alloy
- Flexes as you apply pressure
- Consistently returns to original form

Deluxe Soft Carrying Case

The D4x0/D6x0 probe series includes a deluxe soft carrying case which stores all components of the complete probe system in one convenient location. The case includes a custom foam insert to securely house the platform/cable assembly and the differential probe amplifier. Additionally, a removable protective storage tray has been designed to neatly arrange the complete selection of tips/accessories for ease of accessibility. The deluxe soft carrying case can easily fit in a standard-sized file drawer or shelf for storage and is provided as part of the standard probe configuration.



SPECIFICATIONS

	D610-A-PB2, D610-A-PL	D620-A-PB2, D620-A-PL	D410-A-PB2	D420-A-PB2	D600A-AT-PB2, D600A-AT-PL	D400A-AT-PB2
Bandwidth* (Probe only, guaranteed) (System bandwidth, typical)	Dx10-SI, Dx10-QL-SI and Dx10-PT Tips 6 GHz Dx10-HiTemp 5 GHz Dx10-QC Tip 4 GHz Dx10-SP Tip 3 GHz	Dx20-SI, Dx20-QL-SI and Dx20-PT Tips 6 GHz Dx20-HiTemp 5 GHz Dx20-QC Tip 4 GHz Dx20-SP Tip 3 GHz	Dx10-SI, Dx10-QL-SI, Dx10-HiTemp, Dx10-QC and Dx10-PT Tips 4 GHz Dx10-SP Tip 3 GHz	Dx20-SI, Dx20-QL-SI, Dx20-HiTemp, Dx20-QC and Dx20-PT Tips 4 GHz Dx20-SP Tip 3 GHz	6 GHz	4 GHz
Rise Time* (10–90%)	Dx10-SI, Dx10-QL-SI and Dx10-PT Tips 75 ps (typical) Dx10-HiTemp 90 ps (typical) Dx10-QC Tip 122.5 ps (typical) Dx10-SP Tip 150 ps (typical)	Dx20-SI, Dx20-QL-SI and Dx20-PT Tips 75 ps (typical) Dx20-HiTemp 90 ps (typical) Dx20-QC Tip 122.5 ps (typical) Dx20-SP Tip 150 ps (typical)	Dx10-SI, Dx10-QL-SI, Dx10-HiTemp, and Dx10-PT Tips 112 ps (typical) Dx10-QC Tip 122.5 ps (typical) Dx10-SP Tip 150 ps (typical)	Dx20-SI, Dx20-QL-SI, Dx20-HiTemp, and Dx20-PT Tips 112 ps (typical) Dx20-QC Tip 122.5 ps (typical) Dx20-SP Tip 150 ps (typical)	<75 ps (typical)	<112 ps (typical)
Rise Time* (20–80%)	Dx10-SI, Dx10-QL-SI and Dx10-PT Tips 56 ps (typical) Dx10-HiTemp 67.5 ps (typical) Dx10-QC Tip 92 ps (typical) Dx10-SP Tip 113 ps (typical)	Dx20-SI, Dx20-QL-SI and Dx20-PT Tips 56 ps (typical) Dx20-HiTemp 67.5 ps (typical) Dx20-QC Tip 92 ps (typical) Dx20-SP Tip 113 ps (typical)	Dx10-SI, Dx10-QL-SI, Dx10-HiTemp, and Dx10-PT Tips 84 ps (typical) Dx10-QC Tip 92 ps (typical) Dx10-SP Tip 113 ps (typical)	Dx20-SI, Dx20-QL-SI, Dx20-HiTemp, and Dx20-PT Tips 84 ps (typical) Dx20-QC Tip 92 ps (typical) Dx20-SP Tip 113 ps (typical)	56 ps (typical)	84 ps (typical)
Noise (System)	<36 nV/√Hz (2.8 mVrms) (typical) Referred to input, 6 GHz bandwidth	<61 nV/√Hz (4.8 mVrms) (typical) Referred to input, 6 GHz bandwidth	<36 nV/√Hz (2.3 mVrms) (typical) Referred to input, 4 GHz bandwidth	<67 nV/√Hz (4.3 mVrms) (typical) Referred to input, 4 GHz bandwidth	<74 nV/√Hz (5.8 mVrms) (typical) Referred to input, 6 GHz bandwidth	<74 nV/√Hz (4.7 mVrms) (typical) Referred to input, 4 GHz bandwidth
Input						
Input Dynamic Range (Nominal)	2.5V _{pk-pk} , ±1.25V	5V _{pk-pk} , ±2.5V	2.5V _{pk-pk} , ±1.25V	5V _{pk-pk} , ±2.5V	4.8V _{pk-pk} , ±2.4V	
Input Common Mode Voltage Range (Nominal)	±4 V				±2.4 V _{max}	
Input Offset Voltage Range	±3 V Differential (nominal)				n/a	
Non-destructive Input Range (Nominal)	±20 V				±18 V	
Attenuation	1.7X / 1.0X (nominal)	3.2X / 1.9X (nominal)	1.7X / 1.0X (nominal)	3.2X / 1.9X (nominal)	2.5X	
DC Input Resistance (Nominal)	200 kΩ Differential 50 kΩ Common Mode				4 kΩ Differential 1 kΩ Common Mode	
Impedance (Z_{min}, typical)	Dx10-SI, Dx10-QL-SI, and Dx10-HiTemp >175 Ω Differential† Dx10-PT Tip >175 Ω Differential† Dx10-QC Tip >125 Ω Differential† Dx10-SP Tip >40 Ω Differential†	Dx20-SI, Dx20-QL-SI, and Dx20-HiTemp >250 Ω Differential† Dx20-PT Tip >175 Ω Differential† Dx20-QC Tip >125 Ω Differential† Dx20-SP Tip >40 Ω Differential†	Dx10-SI, Dx10-QL-SI, and Dx10-HiTemp >200 Ω Differential† Dx10-PT Tip >175 Ω Differential† Dx10-QC Tip >100 Ω Differential† Dx10-SP Tip >40 Ω Differential†	Dx20-SI, Dx20-QL-SI, and Dx20-HiTemp >350 Ω Differential† Dx20-PT Tip >175 Ω Differential† Dx20-QC Tip >100 Ω Differential† Dx20-SP Tip >40 Ω Differential†	>200 Ω Differential	>450 Ω Differential through entire frequency range
Impedance (Mid-band, typical)	Dx10-SI, Dx10-QL-SI, and Dx10-HiTemp 275 Ω at 3 GHz, 175 Ω at 6 GHz Dx10-PT Tip 200 Ω at 3 GHz, 200 Ω at 6 GHz Dx10-QC Tip 125 Ω at 3 GHz, 125 Ω at 6 GHz Dx10-SP Tip 40 Ω at 3 GHz, 100 Ω at 6 GHz	Dx20-SI, Dx20-QL-SI, and Dx20-HiTemp 475 Ω at 3 GHz, 250 Ω at 6 GHz Dx20-PT Tip 200 Ω at 3 GHz, 200 Ω at 6 GHz Dx20-QC Tip 125 Ω at 3 GHz, 200 Ω at 6 GHz Dx20-SP Tip 40 Ω at 3 GHz, 175 Ω at 6 GHz	Dx10-SI, Dx10-QL-SI, and Dx10-HiTemp 400 Ω at 2 GHz, 200 Ω at 4 GHz Dx10-PT Tip 275 Ω at 2 GHz, 175 Ω at 4 GHz Dx10-QC Tip 150 Ω at 2 GHz, 125 Ω at 4 GHz Dx10-SP Tip 75 Ω at 2 GHz, 15 Ω at 4 GHz	Dx20-SI, Dx20-QL-SI, and Dx20-HiTemp 700 Ω at 2 GHz, 350 Ω at 4 GHz Dx20-PT Tip 275 Ω at 2 GHz, 175 Ω at 4 GHz Dx20-QC Tip 150 Ω at 2 GHz, 150 Ω at 4 GHz Dx20-SP Tip 75 Ω at 2 GHz, 15 Ω at 4 GHz	650 Ω at 3 GHz, 200 Ω at 6 GHz (Differential)	1000 Ω at 2 GHz, 450 Ω at 4 GHz (Differential)
CMRR (Typical)	30 dB DC to 10 MHz 26 dB 10 MHz to 6 GHz		30 dB DC to 10 MHz 26 dB 10 MHz to 4 GHz		>40 dB DC to 1 GHz >30 dB 1 GHz to 3 GHz >20 dB to 6 GHz	>40 dB DC to 1 GHz >30 dB 1 GHz to 3 GHz >20 dB 3 GHz to 4 GHz

Environmental

Temperature	Operating: 0 °C to 40 °C; Non-operating: -40 °C to 70 °C
Humidity	Operating: 5% to 80% RH (non-condensing), 50% RH above 30 °C Non-operating: 5% to 95% RH (non-condensing), 75% RH above 30 °C and 45% RH above 40 °C
ESD Tolerance	2 kV (typical), 100 pF, 300 Ω HBM

Dimensions

Dx10-PT/Dx20-PT Positioner Tip and Dx00A-AT Browser	0 to 3.5 mm (0 to 0.14"), 305 μm (0.012") diameter 0.55 mm (0.022") Z-axis compliance	0 to 3.0 mm (0 to 0.12"), 75 μm diameter 2 mm Z-axis compliance
Dx10-SI/Dx20-SI Dx10-QC/Dx20-QC Tips	0 to 11 mm (0 to 0.43") tip spread at circuit connection	NA
Cable Length	1.3 m (4 ft. 3 in) for both WL-PLINK and WL-PBUS2	

* All Bandwidth and Rise Time measurements are made with an oscilloscope bandwidth greater or equal to the probe bandwidth

† Through entire frequency range

ORDERING INFORMATION

Product Description

Complete Differential Probes

4 GHz ProBus2 Differential Probe with Dx10-SI Solder-In Tip (Qty. 1), Dx10-SP Square Pin (Qty. 1), and Dx10-QC Quick Connect (Qty. 1)	D410-A-PB2
4 GHz ProLink Differential Probe with Dx10-SI Solder-In Tip (Qty. 1), Dx10-SP Square Pin (Qty. 1), and Dx10-QC Quick Connect (Qty. 1)	D410-A-PL
4 GHz ProBus2 Differential Probe with Dx20-SI Solder-In Tip (Qty. 1), Dx20-SP Square Pin (Qty. 1), and Dx20-QC Quick Connect (Qty. 1)	D420-A-PB2
4 GHz ProLink Differential Probe with Dx20-SI Solder-In Tip (Qty. 1), Dx20-SP Square Pin (Qty. 1), and Dx20-QC Quick Connect (Qty. 1)	D420-A-PL
6 GHz ProBus2 Differential Probe with Dx10-SI Solder-In Tip (Qty. 1), Dx10-SP Square Pin (Qty. 1), and Dx10-QC Quick Connect (Qty. 1)	D610-A-PB2
6 GHz ProLink Differential Probe with Dx10-SI Solder-In Tip (Qty. 1), Dx10-SP Square Pin (Qty. 1), and Dx10-QC Quick Connect (Qty. 1)	D610-A-PL
6 GHz ProBus2 Differential Probe with Dx20-SI Solder-In Tip (Qty. 1), Dx20-SP Square Pin (Qty. 1), and Dx20-QC Quick Connect (Qty. 1)	D620-A-PB2
6 GHz ProLink Differential Probe with Dx20-SI Solder-In Tip (Qty. 1), Dx20-SP Square Pin (Qty. 1), and Dx20-QC Quick Connect (Qty. 1)	D620-A-PL
4 GHz ProBus2 Differential Probe with Adjustable Tip	D400A-AT-PB2
6 GHz ProBus2 Differential Probe with Adjustable Tip	D600A-AT-PB2
6 GHz ProLink Differential Probe with Adjustable Tip	D600A-AT-PL

Positioner Tip (Browser) Kits

WaveLink Dx10-PT Adjustable Positioner Tip Kit. For use with Dx10 amplifiers.	Dx10-PT-KIT
WaveLink Dx20-PT Adjustable Positioner Tip Kit. For use with Dx20 amplifiers.	Dx20-PT-KIT

QuickLink Solder-In Tip Set

QuickLink Solder-In starter pack for use with Dx10 amplifier. Includes one QuickLink adapter and three QL-SI tips.	Dx10-QL-3SI
QuickLink Solder-In starter pack for use with Dx20 amplifier. Includes one QuickLink adapter and three QL-SI tips.	Dx20-QL-3SI

Hi-Temp Leads

WaveLink Temperature Extension Cables for Dx10. Includes set of Matched 30" High Temperature Cables (Qty. 1) and solder-in lead set (Qty. 1)	Dx10-HiTemp
WaveLink Temperature Extension Cables for Dx20. Includes set of Matched 30" High Temperature Cables (Qty. 1) and solder-in lead set (Qty. 1)	Dx20-HiTemp

Product Code

Product Description

Accessories

Cascade Microtech EZ-Probe Positioner	EZ PROBE
Probe Deskew and Calibration Test Fixture	TF-DSQ

Calibration Options

NIST Calibration for D410-A. Includes test data.	D410-A-CCNIST
NIST Calibration for D420-A. Includes test data.	D420-A-CCNIST
NIST Calibration for D610-A. Includes test data.	D610-A-CCNIST
NIST Calibration for D620-A. Includes test data.	D620-A-CCNIST
NIST Calibration for D400A-AT. Includes test data.	D400A-AT-CCNIST
NIST Calibration for D600A-AT. Includes test data.	D600A-AT-CCNIST

Replacement Parts

Single replacement QuickLink Solder-In Tip	QL-SI-1Pack
9-pack of replacement QuickLink Solder-In Tip	QL-SI-9Pack
Replacement Dx10-SI 4 & 6 GHz Solder-In Lead with Qty. 5 Spare Resistors.	Dx10-SI
Replacement Dx20-SI 4 & 6 GHz Solder-In Lead with Qty. 5 Spare Resistors.	Dx20-SI
Replacement Dx10-QC 4 & 6 GHz Quick Connect Lead	Dx10-QC
Replacement Dx20-QC 4 & 6 GHz Quick Connect Lead	Dx20-QC
Replacement Dx10-SP 4 & 6 GHz Square Pin Lead	Dx10-SP
Replacement Dx20-SP 4 & 6 GHz Square Pin Lead	Dx20-SP
Replacement SI Resistor Kit for Dx10/Dx20 - Kit of 20	PKxx0-SI
Replacement QC Resistor Kit for Dx10/Dx20 - 2 kits of 20	PKxx0-QC
Qty. 4 Replacement Pogo Pin Tips and Qty. 2 Replacement Sockets for Dx10-PT and Dx20-PT Adjustable Positioner Tips.	Dxx0-PT-TIPS
Replacement Probe Tip Holder Kit	PK600ST-3
Replacement Platform/Cable Assembly Mounting Kit	PK600ST-4
Quantity 1 Package of Black Adhesive Pads (10/pkg) and Quantity 1 Package of White Adhesive Pads (10/pkg)	Dxx0-PT-TAPE
Quantity 1 Package of Adhesive Probe Connection Guides (200 individual guides/package)	Dxx0-PT-GUIDES

Customer Service

Teledyne LeCroy oscilloscopes and probes are designed, built, and tested to ensure high reliability. In the unlikely event you experience difficulties, our digital oscilloscopes are fully warranted for three years and our probes are warranted for one year.

This warranty includes:

- No charge for return shipping
- Long-term 7-year support
- Upgrade to latest software at no charge

Mouser Electronics

Authorized Distributor

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