

**LeCroy**

**WaveLink® Probe System**



**Unprecedented Flexibility  
for Probe Interconnection**



# Exceptional Waveform Fidelity

**WaveLink® probes provide industry leading technology for wideband signal connection to test instruments. The first differential probes to employ SiGe technology, they deliver full system bandwidth when used with WaveRunner®, WavePro®, WaveMaster®, DDA and SDA oscilloscopes up to 6 GHz.**

WaveLink probes:

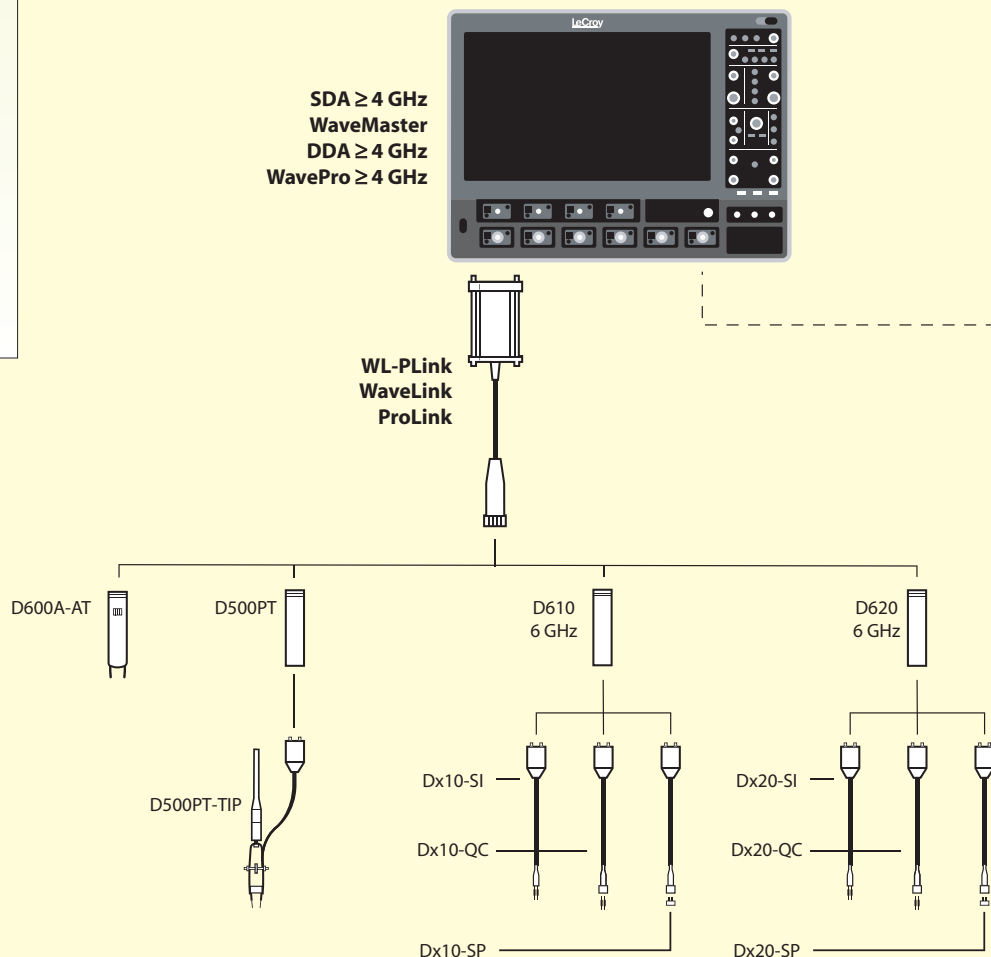
- Use transmission line topology in the input section combined with active differential probe technology
- Maintain good loading characteristics across the frequency span

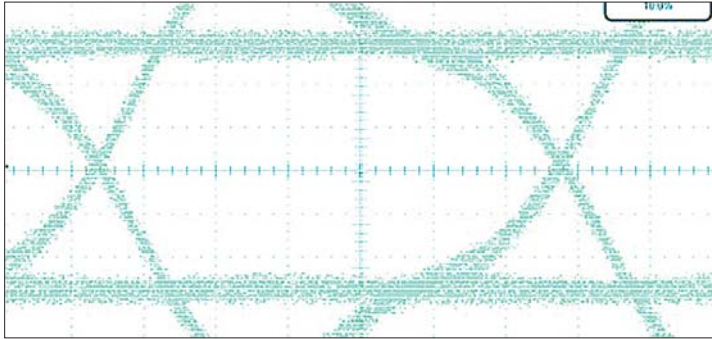
## Very Accurate Eye Pattern Measurements

WaveLink probes virtually eliminate distortion when measuring signals. This benefit is particularly useful in eye pattern measurements, now routine for systems using fast serial parallel data bus architecture.

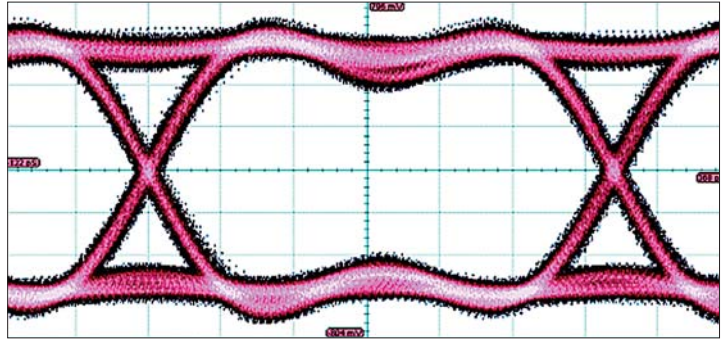
All WaveLink probes offer:

- Superior loading characteristics
  - Precise frequency response with outstanding fidelity for high-speed signals
- Both low loading and frequency response flatness are needed to ensure the signal fidelity required to measure performance accurately.





3.125 Gb/s XAUI signal measured with system using a probe with good frequency flatness, but excessive loading.

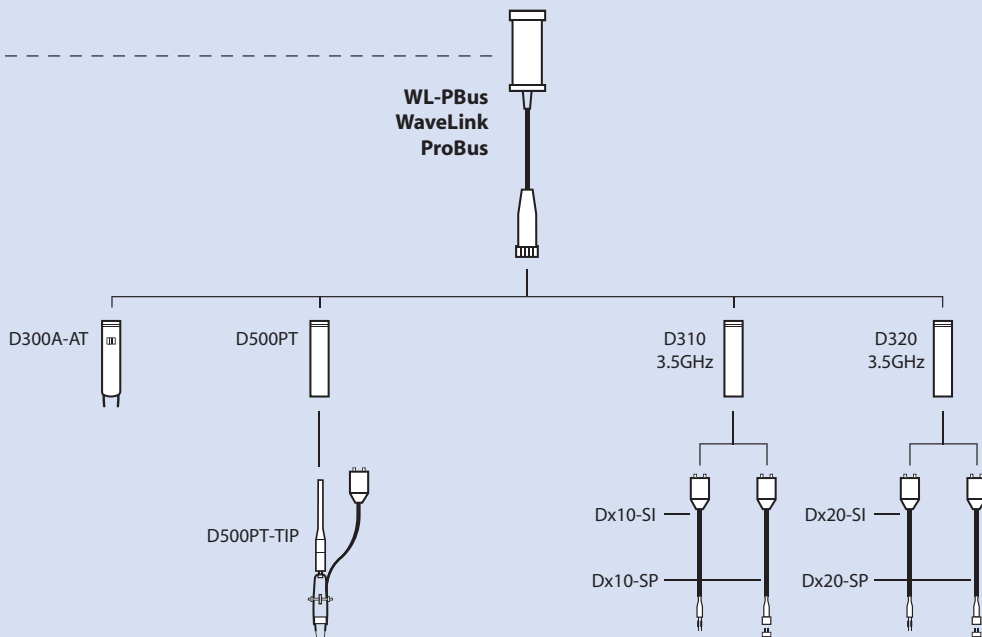


Same signal measured with WaveLink D600A-AT. Low loading and flat frequency response combine to maintain the fidelity in the eye pattern.

SDA  $\leq 3.5$  GHz  
 DDA  $\leq 3.5$  GHz  
 WavePro  $\leq 3.5$  GHz  
 WaveRunner  
 WaveSurfer



WL-PBus  
 WaveLink  
 ProBus



### The Signal Fidelity Advantage is Built In

WaveLink is the first differential probe to use a unique calibration process to achieve superb waveform fidelity for routine voltage measurements.

Calibration coefficients “fine tune” the frequency response of each WaveLink probe and are individually determined during factory calibration and programmed into the probe.

The SDA, DDA, WaveMaster, WaveRunner, or WavePro Series oscilloscopes read this data and use it to digitally compensate the entire system response for superior fidelity.



# Flexible Interconnection Options— Without Sacrificing Performance

## D500PT Positioner Mounted Probe Tip Module

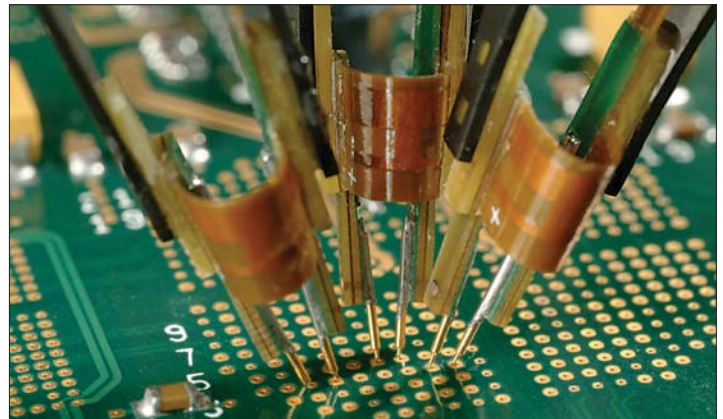
The probe has a very thin form factor, allowing multiple probes to be used when several channels are required to monitor signals from the same small IC. It has 2 mm of Z-axis compliance through spring-loaded telescoping tips, allowing considerable angular freedom relative to the circuit board while still maintaining reliable contact with both inputs. A ball joint between the tip and mounting arm makes it even easier to adjust for placement when already

mounted in a positioner. A small thumbscrew allows precise and secure adjustment of the tip spacing.

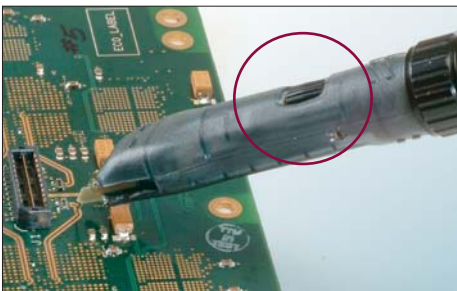
The Positioner Mounted Module, D500PT, can be used as a browser in a positioner such as Easy Probe. Because of its thin form factor and spring-loaded tips, it is ideally suited for use with multiple probes in tight areas, such as the back side of boards with ball-grid array packaged ICs.



The WaveLink Differential Probe Series are high bandwidth active differential probes. These probes are suited for signal integrity measurements in high-speed digital systems.



The Probe Tip Modules contain the active amplifier circuitry. Different modules have different electrical and physical interconnect characteristics, allowing the user to select the module appropriate for the application.



## D600A-AT and D300A-AT Adjustable Tips

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

## EZ-Probe Positioner

The EZ-Probe positioner provides stable, accurate positioning in the x-y-z axis. Ideal for use with the D500PT and D600A-AT/D300A-AT probe tips. The unique, 3:1 motion reduction joystick allows simple, precise positioning of the attached probe in both the horizontal and vertical measuring plane. The probe has a fully articulating arm, providing 30 cm (12") reach in virtually any direction.



## WaveLink D610/D620 and D310/D320

The D610/D310 and D620/D320 probes provide superior electrical characteristics to provide the best signal fidelity.

- Lowest noise performance for accurate measurements
- High DC impedance
- Low loading for minimum signal disturbance
- High sensitivity for probing low voltage signals

The new Dxx0 is superior to single-ended probes for measuring ground referenced signals. Placing the probe will not alter local ground variation, and the measured signal won't be distorted by this variation.

Best-in-class mechanical design for optimum utility:

- Small tip, high bandwidth differential probe
- Three interconnect configurations for flexibility



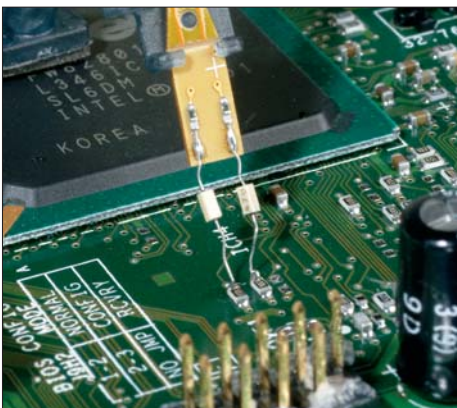
- Very small form factor for accessing tight spaces

Each of the interchangeable leads is a thin, highly flexible 145 mm (5.7") long lead connecting the tip and the D610/D620 and D310/D320 probe tip module.

## Three Different Tips for Interconnect Flexibility

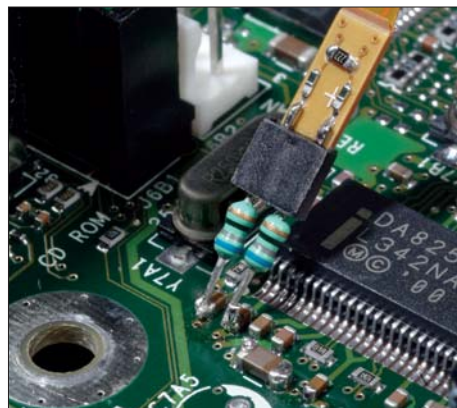
### A. Solder-In Lead

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 providing a reliable, intermittence-free electrical connection. The resistors have highly flexible leads allowing connection to input points with a wide range of input spacing.



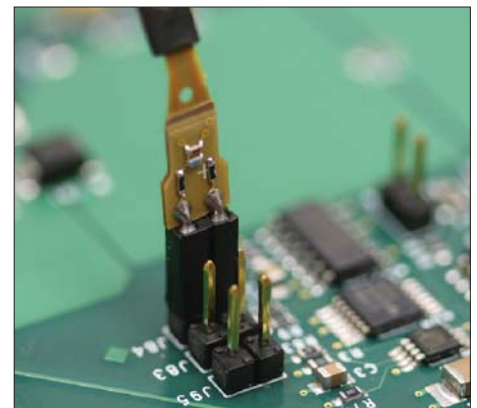
### B. Quick Connect (D6xx only)

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



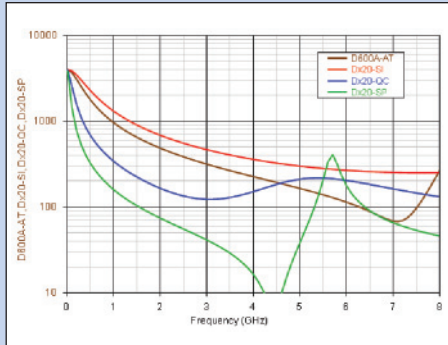
### C. Square Pin

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.

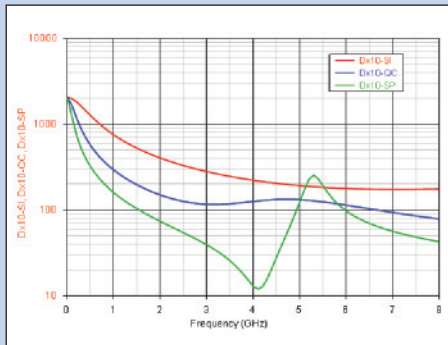


# Specifications

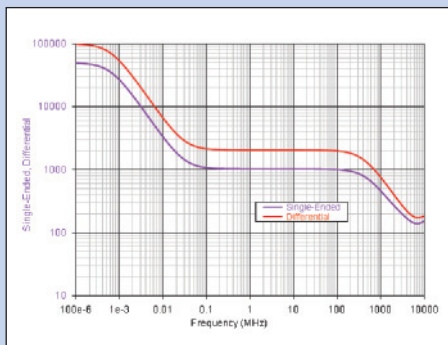
## Dx20 Differential Input Impedance



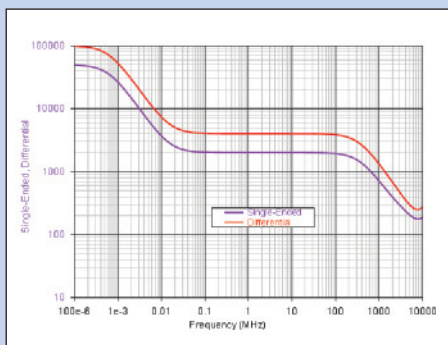
## Dx10 Differential Input Impedance



## Dx10-SI Loading Impedance



## Dx20-SI Loading Impedance



## Warranted Characteristics

### Rise Time (10% – 90%)

D600A-AT	< 70 ps	D600ST-SI	< 65 ps
D500PT	< 100 ps	D350ST-SI	< 90 ps
D300A-AT	< 95 ps		

### LF Attenuation Accuracy

D600A-AT, D300A-AT, and D500PT	2%	0 ± 1.2 V (with 0 V common mode)
	5%	± 1.2 V ± 2.4 V (with 0 V common mode)
D610/D310	2%	< 1.25 V <sub>p-p</sub>
	5%	1.25 V <sub>p-p</sub> to 2.5 V <sub>p-p</sub>
D620/D320	2%	< 2.5 V <sub>p-p</sub>
	5%	2.5 V <sub>p-p</sub> to 5 V <sub>p-p</sub>

### Zero Offset Error (Within 15 minutes after Autozero)

D600A-AT, D300A-AT, and D500PT	< 10 mV RTI
D350ST	< 20 mV
D620/D320	< 5 mV
D610/D310	< 2.5 mV

### Offset Gain Accuracy

D610/D620/D310/D320	1% of offset value
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### Bandwidth, System

D610-SI/D620-SI	6 GHz
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## Typical Characteristics

### Bandwidth, System DC to -3 dB

D6x0-QC	4 GHz**	D300A-AT	3 GHz <sup>††</sup>
Dxx0-SP	3 GHz**	D500PT	5 GHz <sup>†</sup>
D3x0-SI	3.5 GHz**	D600ST-SI	6 GHz
D600A-AT	6 GHz**	D350ST-SI	6 GHz

### Input Differential Range

D600A-AT, D300A-AT, and D500PT	4.8 V <sub>p-p</sub>
D610/D310	2.5 V <sub>p-p</sub>
D620/D320	5.0 V <sub>p-p</sub>

### Differential Offset Range

D610/D310	± 3 V
D620/D320	± 3 V

### Common Mode Range (Max. peak voltage either input to ground)

D600A-AT, D300A-AT, and D500PT	± 2.4 V
D610/D310/D620/D320	± 4 V

### DC Input Resistance

D600A-AT, D300A-AT, and D500PT	4 kΩ differential 2 kΩ either input to ground
D610/D310	100 kΩ differential
D620/D320	50 kΩ either input to ground

### CMRR

D600A-AT	D500PT
DC to 1 GHz > 40 dB	DC to 1 GHz > 25 dB
1 GHz to 3 GHz > 30 dB	1 GHz to 3 GHz > 19 dB
3 GHz to 7 GHz > 20 dB	3 GHz to 5 GHz > 16 dB
D610/D310	D300A-AT
D620/D320	DC to 1 GHz > 40 dB
30 dB DC – 10 MHz	1 GHz to 3 GHz > 30 dB
26 dB 10 MHz max. freq.	

### Noise (System referred to probe input)

D600A-AT and D500PT	5.8 mV <sub>rms</sub> with 6 GHz oscilloscope
D300A-AT	5.0 mV <sub>rms</sub> with 3 GHz oscilloscope
D310	2.0 mV <sub>rms</sub> with 3.5 GHz oscilloscope
D620	4.8 mV with 6 GHz oscilloscope
D610	2.8 mV with 6 GHz oscilloscope
D320	3.6 mV with 3.5 GHz oscilloscope

\* Measured with 6 GHz or greater oscilloscope

\*\* Typical, with 6 GHz or greater oscilloscope

† Measured with 5 GHz oscilloscope

†† Typical, with 3 or 4 GHz oscilloscope

‡ Measured with 3 or 4 GHz oscilloscope



# Ordering Information

## Product Description

## Product Code

### Probe Tip Modules

WaveLink 6 GHz, 2.5 V <sub>p-p</sub> Differential Probe Small Tip Module	D610*
WaveLink 3.5 GHz, 2.5 V <sub>p-p</sub> Differential Probe Small Tip Module	D310*
WaveLink 6 GHz, 5 V <sub>p-p</sub> Differential Probe Small Tip Module	D620*
WaveLink 3.5 GHz, 5 V <sub>p-p</sub> Differential Probe Small Tip Module	D320*
WaveLink 7.5 GHz, Differential Probe Adjustable Tip Module	D600A-AT
WaveLink 4 GHz, Differential Probe Adjustable Tip Module	D300A-AT*
WaveLink 6 GHz, ±2.5 V <sub>p-p</sub> Differential Probe	D600ST*
WaveLink 3.5 GHz, ±10 V <sub>p-p</sub> Differential Probe	D350ST*
WaveLink 6 GHz, Differential Positioner Mounted Tip Module	D500PT*

\* For a complete probe, order a WL-PLink or WL-PBus Probe Body with Probe Tip Module.

### Probe Bodies

WaveLink ProLink Probe Body	WL-PLink
WaveLink ProBus Probe Body	WL-PBus

### Positioner

Cascade Microtech EZ-Probe Positioner	EZ PROBE
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### Service Options

NIST Traceable Calibration with Test Data <sup>†</sup> (one module)	D600A-AT-CCNIST D300A-AT-CCNIST D500PT-CCNIST D610-CCNIST D620-CCNIST D310-CCNIST D320-CCNIST
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<sup>†</sup>CCNIST NIST traceable calibration with test data is an available option for D600ST, D350ST, D500PT, D600A-AT, or D300A-AT probe tip module only when ordered with either a WL600 or WL300 probe body.

### Consumables and Replacement Parts

Replacement Quick Connect Lead Set for D610	Dx10-QC
Replacement Solder-In Lead Set for D610/D310	Dx10-SI
Replacement Square Pin Lead Set for D610/D310	Dx10-SP
Replacement Solder-In Lead Set for D620/D320	Dx20-SI
Replacement Square Pin Lead Set for D620/D320	Dx20-SP
Replacement Quick Connect Lead Set for D620	Dx20-QC
Replacement Tip Assembly for D500PT	D500PT-TIP
Replacement SI Resistor Kit (20)	PKxx0-SI
Replacement QC Resistor Kit (20)	PKxx0-QC
Replacement Probe Tip Holder Kit	PK600ST-3
Replacement Probe Body Mounting Kit	PK600ST-4
Replacement Probe Tips for D500PT (pkg. of 4)	PK500PT-1
Probe Characterization Fixture	PCF-200
WaveLink Probe Series Instruction Manual	WL-OM-E

### D600A-AT, D300A-AT Adjustable Tip Modules Include:

Protective storage case, ground wire and clip, WaveLink Series instruction manual, Quick Start guide, calibration certificate.

### D610/D620 Small Tip Module Includes:

Solder-In interconnect lead set with replacement damping resistors (10), Quick Connect interconnect lead set with additional damping resistors (20), Square Pin interconnect lead set, ground wire and clip, probe tip mounting kit, WaveLink Series instruction manual, Quick Start guide, calibration certificate.

### D310/D320 Small Tip Module Includes:

Solder-In interconnect lead set with replacement damping resistors (10), Square Pin interconnect lead set, ground wire and clip, probe tip mounting kit, WaveLink Series instruction manual, Quick Start guide, calibration certificate.

### D500PT Positioner Mounted Tip Includes:

Positioned tip assembly, Probe tip module, Module mounting clamp, Ground lead and clip, WaveLink Series instruction manual, Quick Start guide, Calibration certificate, FreeHand probe stand, Tip repair tool, Replacement tips (2)

### WL-PLink, WL-PBus Probe Bodies Include:

SAC-01 Soft accessory case with WaveLink Series insert, probe characterization fixture, probe body mounting clip, probe cable clamp (2), and small probe accessory case.

### WaveLink Probe Calibration

When ordered with WL-PLink or WL-PBus also substitute: Certificate of NIST traceable calibration in place of calibration certificate.

### Customer Service

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



The WaveLink Differential Probe Series is modular in concept accepting several interchangeable Probe Tip Modules to allow for flexibility in physical interconnect, and optimizes bandwidth and electrical performance.

See **WaveLink Probe Compatibility Chart** on back cover.

# WaveLink Probe Compatibility Chart

	SDA 6xxx				WP 7xxx					
	SDA 5xxx				WP 735Zi					
	SDA 4xxx		DDA 3xxx	DDA 735Zi	WP 725Zi		WRMXi	WSMXs	WL-PLink	WL-PBus
	SDA 760Zi	WM 8xxx	DDA 760Zi	SDA 3xxx	WP 715Zi	WR 6xxx	WRXi	WSXs	Probe Body	Probe Body
WL-PLink	•	•	•						N/A	N/A
WL-PBus				•	•	•	•	•	N/A	N/A
D600A-AT	•	•	•						FP	RP
D300A-AT				•	•	•	•	•	FP	FP
D600ST	•	•	•						FP	RP
D350ST				•	•	•	•	•	FP	RP
D610	•	•	•						FP	RP
D310				•	•	•	•	•	FP	RP
D620	•	•	•						FP	RP
D320				•	•	•	•	•	FP	RP
D500PT	•	•	•	•	•	•	•	•	FP	RP

•	Recommended
NC	Not Compatible
FP	Operates at Full Performance
RP	Operates with Reduced Performance
RA	Requires TCA-BNC Adapter



1-800-5-LeCroy [www.lecroy.com](http://www.lecroy.com)

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