

DH Series Probes (8 GHz – 30 GHz)



Key Features

Bandwidth models from 8 GHz to 30 GHz

Low loading and high impedance for minimal signal disturbance

Wide variety of tips:

- Standard and high-sensitivity 30 GHz solder-in tips
- High-temperature solder-in tip with 1-meter lead
- QuickLink adapter for mixed-signal probing
- Handheld browser tip
- Tips for direct connection to CrossSync PHY™ protocol analyzer interposers

Built-in tip identification for simple setup and precise signal reproduction

Ideal for debug and validation of:

- DDR3/LPDDR3
- DDR4/LPDDR4
- DDR5/LPDDR5
- Other high-speed serial interfaces

The DH series of 8 to 30 GHz active differential probes provides high input dynamic range, large offset capability, low loading and excellent signal fidelity with a range of connection options.

General Purpose Probing up to 30 GHz

Teledyne LeCroy's DH series of 8 GHz to 30 GHz differential probes offer the combination of bandwidth, input range and offset to capability to address any high-speed probing requirement - from debugging serial data interfaces to validating DDR memory systems.

Exceptional Signal Fidelity

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

Wide Variety of Tips

Two 30 GHz solder-in leads let you choose between a 3.5 Vpp input range for general-purpose applications, or high sensitivity with exceptionally low noise. Also available are a 1-meter long 16 GHz high-temperature tip, a 16 GHz handheld browser tip, and an 8 GHz QuickLink adapter for connecting mixed-signal probe tips.

Tip Identification

Each DH series tip has its own data onboard - the oscilloscope software automatically selects the correct tip type and precisely corrects for its effects. The result is superior signal fidelity and superior ease-of-use.

SUPERIOR SIGNAL FIDELITY AND EASE OF USE

The DH series of differential voltage probes combine a set of innovative features that make accessing high-speed signals easy with up to 30 GHz bandwidth, exceptionally low noise and superior loading characteristics.



1. **Up to 30 GHz bandwidth** with wide input voltage range and offset capabilities
2. **Tip identification** eliminates setup errors by automatically detecting tip type
3. **Onboard tip calibration data** optimizes signal fidelity and accuracy
4. **Exceptional noise performance** for cleaner signals and better measurements
5. **Superior loading characteristics** mean probe does not impact device performance
6. **Compact one-piece design** with a low-profile amplifier reduces clutter
7. **Robust mechanical design** for excellent tip retention and long-term reliability
8. **Small tip geometry and long leads** for embedded systems with DDR memory and other high-density components



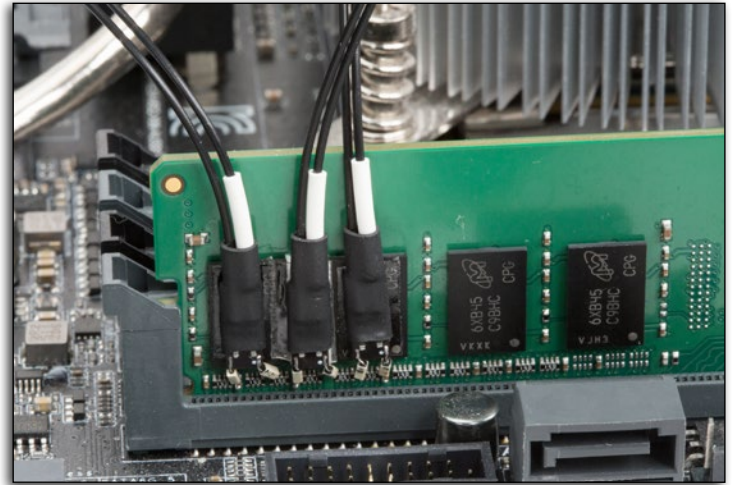
WIDE VARIETY OF TIPS

The same solder-in, high-temperature, browser, and QuickLink tips are compatible with all DH series probes and can be interchanged between any probes in the series for ultimate flexibility in the lab. Each tip contains its own identification and calibration data for accurate signal reproduction and superior ease of use.

Solder-In Tips (DH-SI and DH-SI-HS)

The 30 GHz DH series solder-in tips are extremely small to facilitate access to signals on tightly-packed boards, with a 9-inch lead length to help reach difficult probing points.

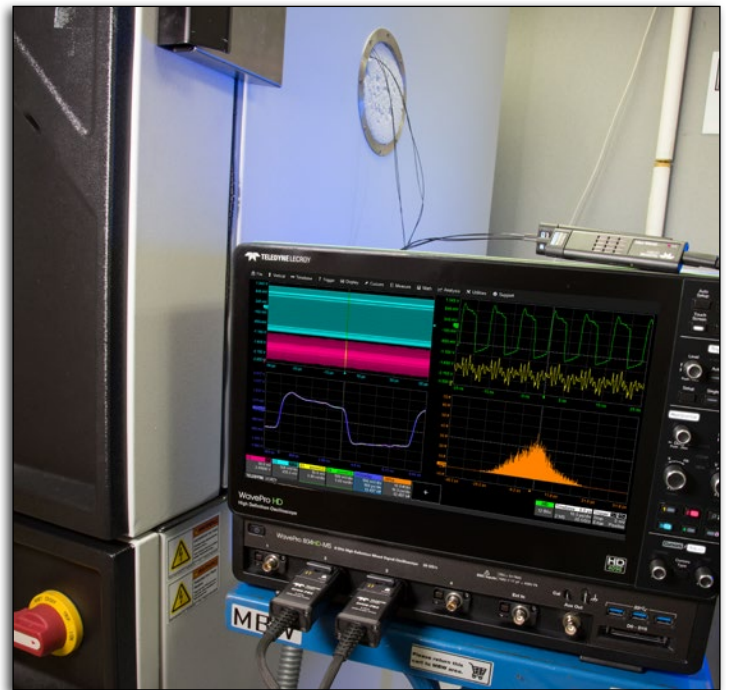
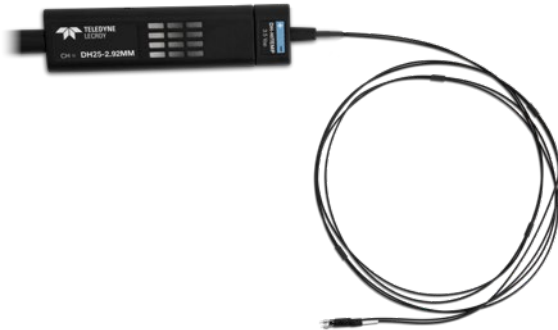
The standard DH-SI tip has a 3.5 Vpp input range, perfect for DDR memory and other general-purpose, high-speed serial signal applications. For smaller signals where low noise is critical, the DH-SI-HS high-sensitivity tip has a 2.0 Vpp input range and exceptional noise performance.



High Temperature Tip (DH-HITEMP)

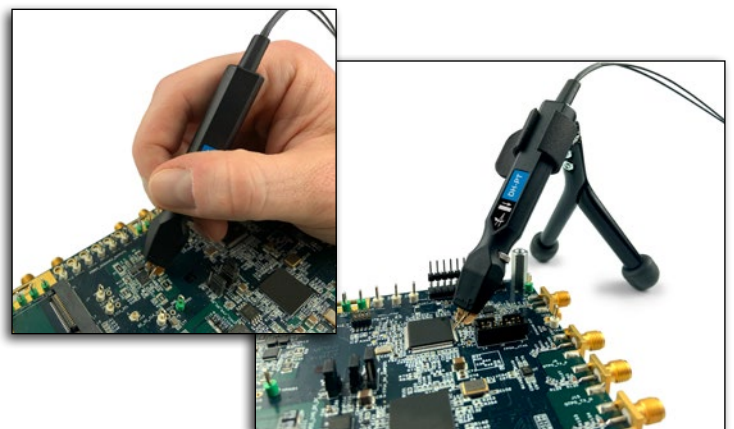
For tests where the device must be placed in an environmental chamber, the DH-HITEMP tip allows the solder-in probe tip to be separated from the probe amplifier by up to 1 meter.

The tip offers 16 GHz bandwidth, 3.5 Vpp input range, and an operating temperature range of -40 °C to +125 °C, making it ideal for environmental testing of a wide variety of high-speed devices.



Positioner (Browser) Tip (DH-PT)

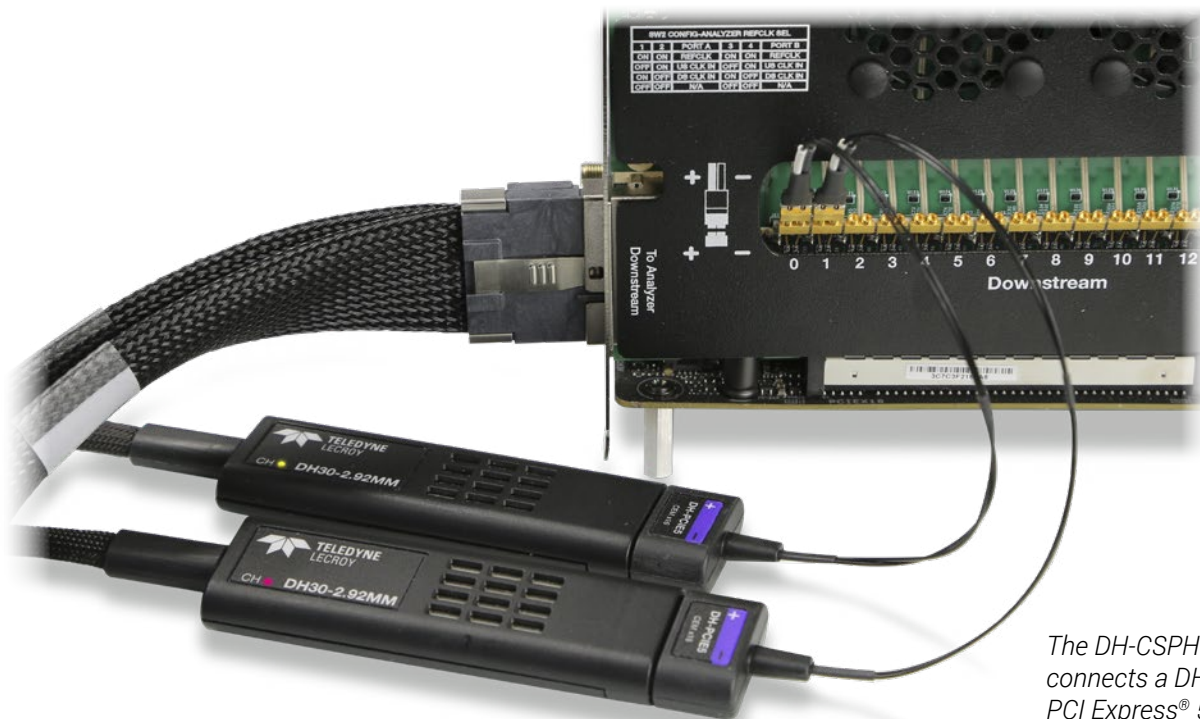
In situations where quick access to many test points is critical, the DH-PT browser tip offers 16 GHz of bandwidth in a convenient "pencil"-style form factor. An included Freehand probe holder allows simple hands-free browsing.



CROSS-LAYER AND MIXED-SIGNAL PROBING

CrossSync PHY™ Cross-layer Probing (DH-CSPHY)

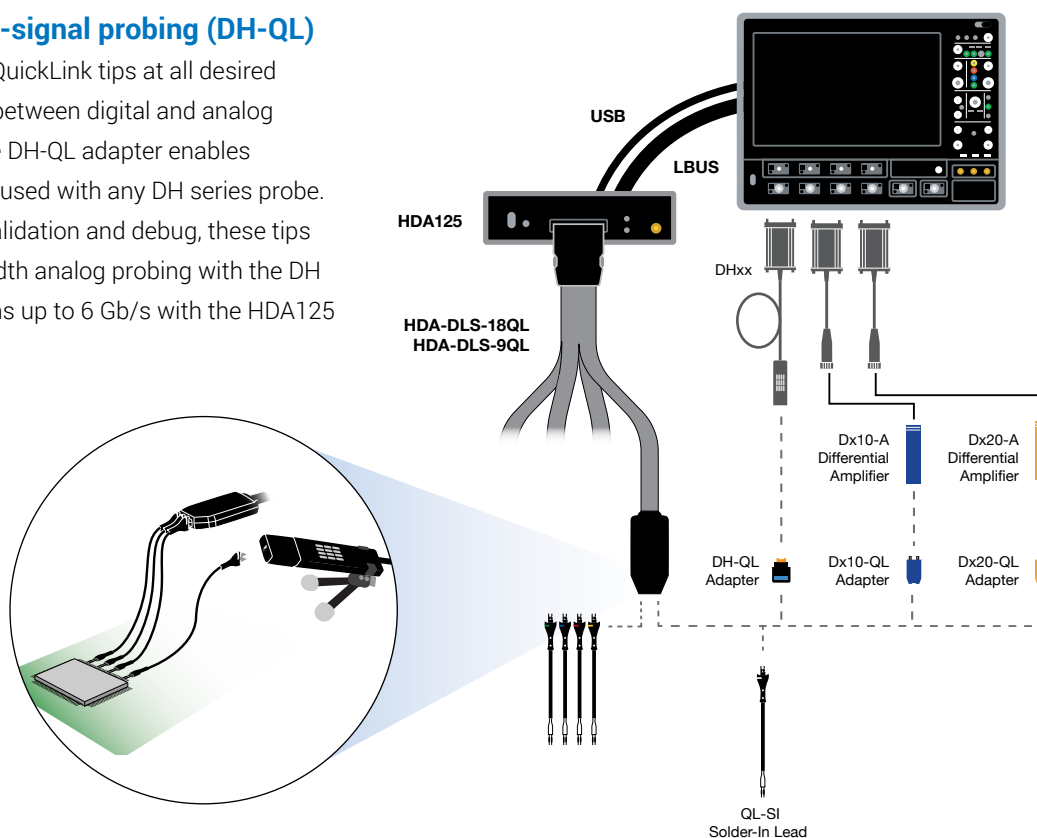
CrossSync PHY technology enables waveforms from Teledyne LeCroy oscilloscopes to be viewed alongside protocol analyzer traces, with complete time-correlation of electrical and protocol information. A range of CrossSync PHY enabled interposers provides direct connection for DH Series probes to high-speed signal lines using special DH-CSPHY probe tips.



The DH-CSPHY-PCIE5-CEM16 tip connects a DH Series probe to a PCI Express® 5.0 CEM interposer.

QuickLink Adapter for mixed-signal probing (DH-QL)

Equip your system under test with QuickLink tips at all desired test points, and swap connections between digital and analog acquisition systems as needed. The DH-QL adapter enables QuickLink solder-in probe tips to be used with any DH series probe. For DDR and embedded systems validation and debug, these tips can be used for both 8 GHz bandwidth analog probing with the DH series probes and digital acquisitions up to 6 Gb/s with the HDA125 high-speed digital analyzer.



SPECIFICATIONS

| | DH08 | DH13 | DH16 | DH20 | DH25 | DH30 |
|--|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Bandwidth | | | | | | |
| Bandwidth (probe only) | 8 GHz | 13 GHz | 16 GHz | 20 GHz | 25 GHz | 30 GHz |
| Bandwidth with DH-SI or DH-SI-HS tip | 8 GHz | 13 GHz | 16 GHz | 20 GHz | 25 GHz | 30 GHz |
| Bandwidth with DH-HITEMP tip | 8 GHz | 13 GHz | 16 GHz | 16 GHz | 16 GHz | 16 GHz |
| Bandwidth with DH-PT browser | 8 GHz | 13 GHz | 16 GHz | 16 GHz | 16 GHz | 16 GHz |
| Bandwidth with DH-QL adapter and QL-SI tip | 8 GHz | 8 GHz | 8 GHz | 8 GHz | 8 GHz | 8 GHz |
| Rise Time* | | | | | | |
| Rise Time (10-90%) | 56 ps | 34.5 ps | 28 ps | 22.5 ps | 18 ps | 15 ps |
| Rise Time (20-80%) | 37.5 ps | 23 ps | 19 ps | 15 ps | 12 ps | 10 ps |
| Probe noise (referred to input)* | | | | | | |
| With DH-SI-HS tip | 2.1 mV _{rms} | 2.2 mV _{rms} | 2.3 mV _{rms} | 2.6 mV _{rms} | 2.9 mV _{rms} | 3.2 mV _{rms} |
| With all other tips | 3.5 mV _{rms} | 3.8 mV _{rms} | 4.2 mV _{rms} | 4.6 mV _{rms} | 4.8 mV _{rms} | 5.0 mV _{rms} |
| Probe noise density (referred to input) | | | | | | |
| With DH-SI-HS tip | 18 nV/rt(Hz) | | | | | |
| With all other tips | 30 nV/rt(Hz) | | | | | |
| Input | | | | | | |
| Input Dynamic Range | | | | | | |
| With DH-SI-HS tip | 2.0 Vpp (±1.0 V) | | | | | |
| With all other tips | 3.5 Vpp (±1.75 V) | | | | | |
| Input Common Mode Voltage Range | | | | | | |
| ±5.0 V | | | | | | |
| Input Offset Voltage Range | | | | | | |
| ±4.0 V | | | | | | |
| Non-destructive Input Range | | | | | | |
| ±16 V | | | | | | |
| Attenuation | | | | | | |
| With DH-SI-HS tip | 1.8x / 3.2x (selected automatically by oscilloscope software) | | | | | |
| With all other tips | 3.2x / 5.8x (selected automatically by oscilloscope software) | | | | | |
| Attenuation Accuracy | | | | | | |
| ±2% | | | | | | |
| DC Input Resistance (nominal) | | | | | | |
| Differential | 200 kΩ differential | | | | | |
| Common mode | 50 kΩ differential | | | | | |
| Input Resistance > 10 kHz (typical) | | | | | | |
| With DH-SI-HS tip | 1100 Ω differential | | | | | |
| With all other tips | 2100 Ω differential | | | | | |
| Environmental | | | | | | |
| Temperature | | | | | | |
| Non-operating | -40 °C to 70 °C | | | | | |
| Operating (DH-HITEMP tip) | -40 °C to 125 °C | | | | | |
| Operating (Probe and all other tips) | 0 °C to 40 °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 | | | | | |
| Dimensions | | | | | | |
| DH-SI and DH-SI-HS tips | 0 to 9 mm (0 to 0.35") tip spread at circuit connection 10" overall length | | | | | |
| DH-HITEMP tip | 0 to 9 mm (0 to 0.35") tip spread at circuit connection 1 m overall length | | | | | |
| DH-PT positioner tip | 17.5" overall length (browser + cable + connection to amplifier) 3.5 mm (0.14") maximum pogo pin spacing (typical) 305 μm (0.012") pogo pin diameter 0.55 mm (0.022") Z-axis pogo pin compliance | | | | | |
| Cable length | | | | | | |
| 1.2 m | | | | | | |

* All Rise Time and Probe noise measurements are made using a full-bandwidth solder-in tip, and with an oscilloscope bandwidth greater than or equal to the probe bandwidth. When using other tips, rise time and noise measurements correspond to those of the equivalent-bandwidth probe model with a DH-SI tip.

ORDERING INFORMATION

Product Description

Differential Probes (tips not included)

| | |
|--|-------------|
| 8 GHz differential probe with ProBus2 interface | DH08-PB2 |
| 8 GHz differential probe with ProLink interface | DH08-PL |
| 13 GHz differential probe with ProLink interface | DH13-PL |
| 16 GHz differential probe with ProLink interface | DH16-PL |
| 20 GHz differential probe with ProLink interface | DH20-PL |
| 25 GHz differential probe with 2.92 mm interface | DH25-2.92MM |
| 30 GHz differential probe with 2.92 mm interface | DH30-2.92MM |

Solder-in Tips

| | |
|--|----------|
| DH series solder-in tip, 30 GHz BW, 3.5 Vpp range | DH-SI |
| DH series high-sensitivity solder-in tip, 30 GHz BW, 2.0 Vpp range | DH-SI-HS |

Positioner (Browser) Tips

| | |
|--|-------|
| DH series PT browser tip, 16 GHz BW, 3.5 Vpp range | DH-PT |
|--|-------|

High-temperature Tips

| | |
|--|-----------|
| DH series high-temperature solder-in tip, 16 GHz BW, 3.5 Vpp range | DH-HITEMP |
|--|-----------|

QuickLink Adapters and Kits

| | |
|---|-----------|
| DH series QuickLink adapter, 8 GHz BW | DH-QL |
| DH series QuickLink adapter kit with 3 x QL-SI tips | DH-QL-3SI |

CrossSync PHY Tips

| | |
|---|----------------------|
| DH series tip for PCIe 5.0 CEM interposer - connects to PET20ACA-X interposer accessory | DH-CSPHY-PCI5-CEMX16 |
|---|----------------------|

Accessories

| | |
|--|--------------|
| ProLink to 2.92 mm adapter with probe power and communication pass through | LPA-2.92 |
| 2.92 mm to ProLink adapter with probe power and communication pass through | L2.92A-PLINK |

Product Code

Product Description

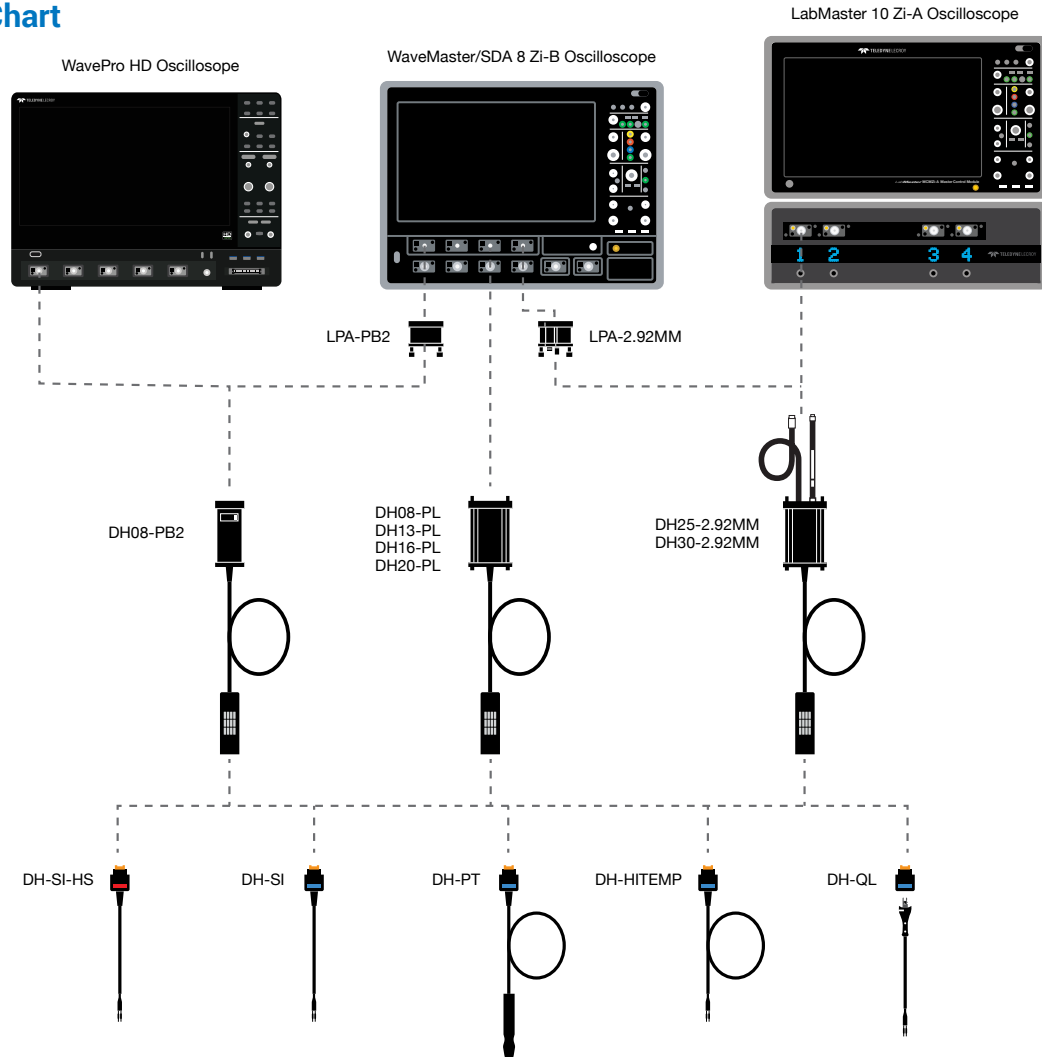
Calibration Options

| | |
|--|--|
| 3-year warranty | DH08-W3, DH13-W3, DH16-W3, DH20-W3, DH25-W3, DH30-W3 |
| 5-year warranty | DH08-W5, DH13-W5, DH16-W5, DH20-W5, DH25-W5, DH30-W5 |
| 3-year annual NIST calibration | DH08-C3, DH13-C3, DH16-C3, DH20-C3, DH25-C3, DH30-C3 |
| 5-year annual NIST calibration | DH08-C5, DH13-C5, DH16-C5, DH20-C5, DH25-C5, DH30-C5 |
| 3-year warranty with annual NIST calibration | DH08-T3, DH13-T3, DH16-T3, DH20-T3, DH25-T3, DH30-T3 |
| 5-year warranty with annual NIST calibration | DH08-T5, DH13-T5, DH16-T5, DH20-T5, DH25-T5, DH30-T5 |
| NIST traceable calibration with test data | DH08-CCNIST, DH13-CCNIST, DH16-CCNIST, DH20-CCNIST, DH25-CCNIST, DH30-CCNIST |

Replacement Parts

| | |
|---|-----------------|
| Replacement SI resistor kit for DH-SI and DH-SI-HS solder-in tips | DH-SI-RESISTORS |
|---|-----------------|

Compatibility Chart



For more information, please contact:



ADMESS Vertriebs GmbH
Ernst-Kiefer-Straße 9
67292 Kirchheimbolanden /Germany

Tel.: +49 (0) 6352 / 78 99 8 - 0
Telefax: +49 (0) 6352 / 78 99 8 - 20
E-Mail: info@admess.de
www.admess.de

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



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Local sales offices are located throughout the world.
Visit our website to find the most convenient location.

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