

# T3SP-D4MX-BUNDLE Data Sheet

## Differential High-Frequency DP4T/2:8 Multiplexer

**Phased Matched RF Multiplexer**  
 includes mated cable set for accurate measurements



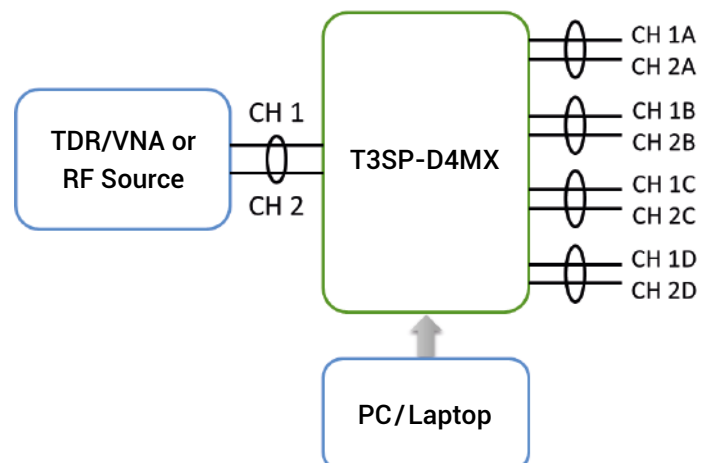
Front panel of the T3SP-D4MX

### Affordable Tools for Precision Debugging

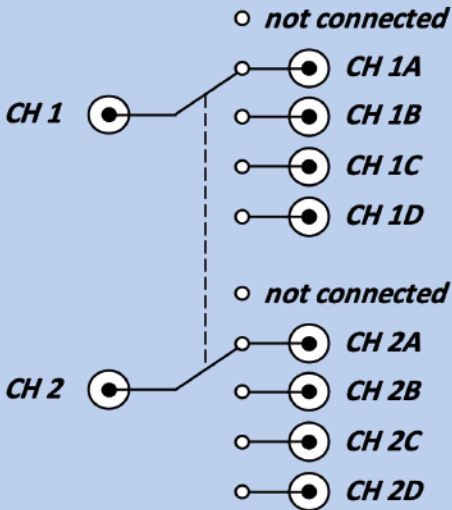
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|--|---|
| • DP4T/2:8 High Frequency Multiplexer  | ✓ Versatile RF switch for differential and single-ended applications  |
| • Differential (100 Ω) or single-ended (50 Ω)  | ✓ Phase matched differential channels and high isolation between CH1/2                                      |
| • Frequency Bandwidth from DC up to 10 GHz   | ✓ High-performance RF specs for Return Loss and Insertion Loss  |
| • Instant multi-pairs cable and connector testing with TDR – Verify the quality of your cables and connectors. | ✓ Detect even on your premium cables any imperfection that might be the root cause of measurement artifacts |
| • Internal ESD protection, 1 billion switching cycle   | ✓ Ideal to be used combined with TDR for impedance profile measurements                                     |
| • SW programming interface included  | ✓ Simple graphical SW tool ideal for testing purpose  |
| • USB controlled and powered, small form factor  | ✓ Easy to use, measure and analyze everywhere you go without an AC power                                    |

### Typical Applications

- TDR and VNA Multiplexing for stimulus-response Measurements
- Automatic multi-pairs cable testing system
- High-Speed serial data stream switching
- RF signal switching and testing



# SPECIFICATIONS



Simplified functional diagram showing input ports CH1 and CH2 to the left and the blocks of four output ports for each input port. Alternatively, the input can be set to an unconnected state.

## RF Characteristics (single-ended)

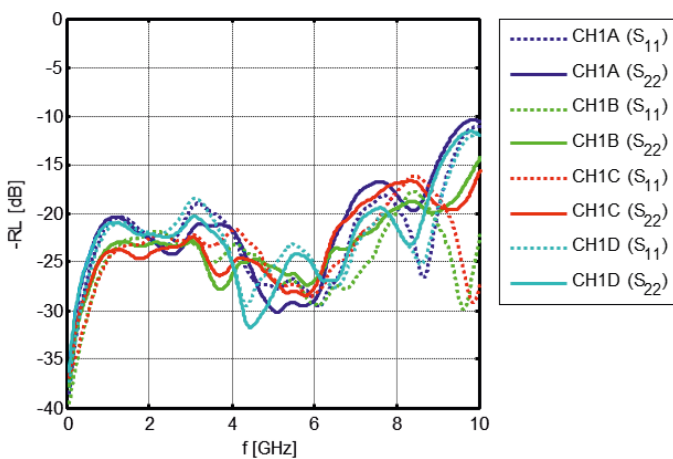
Insertion Loss (typ.)	< 0.4 dB	DC to 0.3 GHz
	< 1 dB	0.3 GHz to 2 GHz
	< 3 dB	2 GHz to 8 GHz
	< 5 dB	8 GHz to 10 GHz
Return Loss (CH1 and CH2 input, typ.)	> 25 dB	DC to 0.3 GHz
	> 18 dB	0.3 GHz to 2 GHz
	> 15 dB	2 GHz to 8 GHz
	> 10 dB	8 GHz to 10 GHz
Isolation (contacts same channel, typ.)	> 45 dB	DC to 0.3 GHz
	> 32 dB	0.3 GHz to 2 GHz
	> 27 dB	2 GHz to 10 GHz

## RF Characteristics (Differential\*)

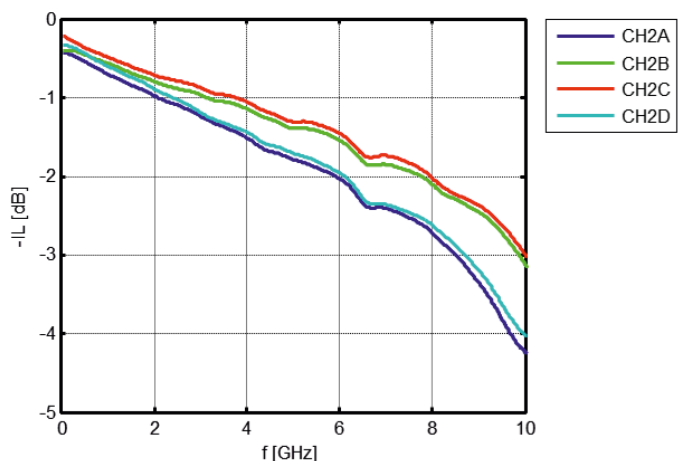
Isolation between CH1 and CH2 (typ.)	> 60 dB	DC to 010 GHz
Group delay deviation CH1 and CH2 (typ.)	± 5 ps	DC to 010 GHz

\* measured between same path (A, B, C, D) of CH1 and CH2

## Typical RF-Performance Plots



Return loss (RL) of CH1 and CH2-input (S11) when routed to 50 Ω-terminated output respectively CH1<X> port and CH2<X> port (S22).



Insertion loss (IL) between CH1 or CH2-input and, respectively, CH1<X> or CH2<X> output ports.

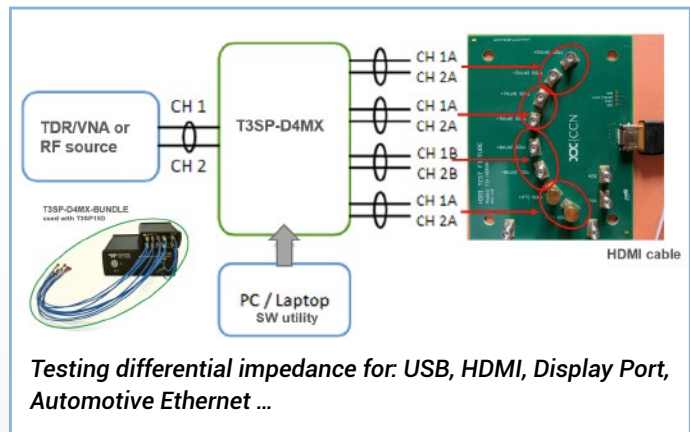
# Key Benefits

## Quality of multi-channels differential pairs cables instantly revealed

Assuming cables are perfect is a common mistake.

You make a measurement that involves a fast edge or high bandwidth signal and something doesn't look quite right. In those situations, you add a bad cable to your list of "usual suspects".

Unless you have verified the quality of your cables, there is always the possibility that even your premium cables may have some imperfections that can cause measurement artifacts. The T3SP-series TDR reveals immediately the quality of your multi-channels differential pairs cables and connectors, identifying parts that are out of spec, due to damage or defects. This dramatically improves your productivity and increases the confidence in your design and results.



## Electrical Characteristics

Operating frequency	0 – 10 GHz (–3 dB BW: 8 GHz)
RF max. power ratings	30 dBm (50 Ω load), 24 dBm (open)
RF input voltage range (DC)	±6 V
RF input current range (DC)	±200 mA
Contact resistance (ON)	1.8 Ω (typ.), 3.5 Ω (max.)
Contact resistance (OFF)	> 1 GΩ (@ ±6 V)
Hardware switching time (without software latency)	< 100 μs
Switching time (with software latency*)	< 10 ms
Switching cycles (min. operations, mechanical)	10 <sup>9</sup>
Switching cycles (min. operations, electrical)	500·10 <sup>6</sup> (hot switching, 10 dBm in 50 Ω)

\* Latency due to internal programming.  
It can increase with high data traffic on the USB port.

## Power Requirements

Power supply voltage	5 V (via USB)
Power supply current	< 12 mA

## Electrostatic Discharge (ESD)

RF (in/out), human body model (HBM)	5 kV
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## Temperature Range and Humidity

Temperature	0 – 55 °C
Humidity	5 % – 85 % (R.H., without condensation)

## Dimension

With connectors	49 × 108 × 180 mm
Without connectors	49 × 108 × 165 mm

## Ordering information

Product Description	Product Code
Differential High-frequency DP4T/2:8 Multiplexer	T3SP-D4MX-BUNDLE

### Included with T3SP-D4MX-BUNDLE:

- T3SP-D4MX Multiplexer Mainframe
- 1 x pair of phase matched cables (±2 ps), 8-inch, Channel Inputs
- 4 x pairs of phase matched and color-coded cables (black, white, yellow and red), 24-inch, Channel Outputs
- 2 m USB2.0 cable with ferrite
- 10 conductive protective caps
- Conformance Certificate

Standard warranty is one year (for warranty extension please contact Teledyne LeCroy Service)

# ABOUT TELEDYNE TEST TOOLS



## Company Profile

Teledyne LeCroy is a leading provider of oscilloscopes, protocol analyzers and related test and measurement solutions that enable companies across a wide range of industries to design and test electronic devices of all types. Since our founding in 1964, we have focused on creating products that improve productivity by helping engineers resolve design issues faster and more effectively. Oscilloscopes are tools used by designers and engineers to measure and analyze complex electronic signals in order to develop high-performance systems and to validate electronic designs in order to improve time to market.

The Teledyne Test Tools brand extends the Teledyne LeCroy product portfolio with a comprehensive range of test equipment solutions. This new range of products delivers a broad range of quality test solutions that enable engineers to rapidly validate product and design and reduce time-to-market. Designers, engineers and educators rely on Teledyne Test Tools solutions to meet their most challenging needs for testing, education and electronics validation.

## Location and Facilities

Headquartered in Chestnut Ridge, New York, Teledyne Test Tools and Teledyne LeCroy has sales, service and development subsidiaries in the US and throughout Europe and Asia. Teledyne Test Tools and Teledyne LeCroy products are employed across a wide variety of industries, including semiconductor, computer, consumer electronics, education, military/aerospace, automotive/industrial, and telecommunications.

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T3 stands for Teledyne Test Tools.

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