# N7019A USB Type-C® Active Link Fixture



The Keysight Technologies, Inc. N7019A Type-C Active Link fixture provides a fast and easy access to test, debug and decode your Type-C active link. Used in conjunction with the Keysight Protocol and Decode SW, you can now access, debug, and decode Vbus, USB-PD, USB 2.0, USB 3.2, and USB4 SB, USB4 10G, and USB4 20G, on an active link.

#### **Features**

- Provides access to all Type-C signals during an active link
- Signals include Vbus, USB 2.0, USB-PD, SBU1/2, and TX/RX up to maximum USB4 rate of 20 Gbps
- Works in conjunction with Keysight Protocol Trigger Decode solutions for USB-PD, USB 2.0, USB 3.2, and USB4

#### Type-C Active Link Signal Access

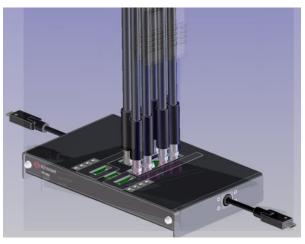
For a USB4 active link to function correctly, many different signals need to be transmitted and received on a live link – Vbus, USB-PD, SBUTX/RX, TX/RX.

With the N7019A, you can access and view all Type-C signals and determine where in the link start-up an error occurred. Coupled with the Keysight suite of Protocol Trigger and Decode solutions, you can time-correlate protocol errors with signal integrity issues in the time domain.

Depending on the Type-C signal being accessed, there are different ways to connect to the N7019A (Figure 1).

- Vbus: N7023A Power Rail probe browser.
- USB 2.0: N2871A probe or E2678B probe heads.
- USB4 10G/20G: N2823A phase-matched cables.
- SBU: N2871A probe or E2678B probe heads.





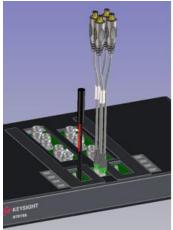




Figure 1: Connecting to the N7019A

#### Type-C Active Link Decode and Debug

During a USB4 link-up, optimization of both the TX and RX equalization are critical to achieving a low BER link.

Figure 2 shows the low-speed negotiation occurring on the SBU lines.

In parallel, Figure 3 shows the high-speed training occurring on the TX 20 Gbps lines.

In addition to the decode view, you can also view and debug the time-correlated analog signal waveform that is the source of both the low-speed and 20 Gbps decode.

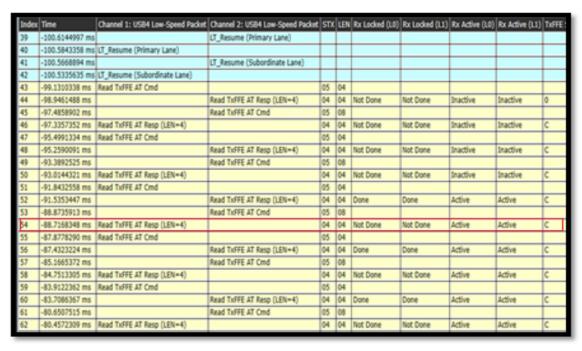
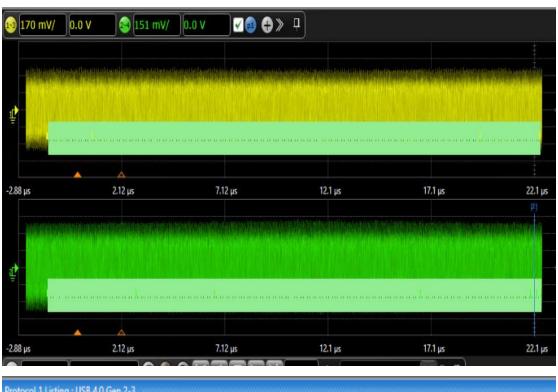


Figure 2: USB4 Low Speed SBU decode



Protoco	Protocol 1 Listing : USB 4.0 Gen 2-3										
Packets	Packets • • • • •										
Index	Time	FEC	Channel 1 - 3: USB4 Packet	Channel 2 - 4: USB4 Packet	HEC	Length	HopID	SuppID	PDF	Sec	
445	21.35259949 µs			SLOS1 (Gen2,3)							٨
446	21.38353262 µs		SLOS1 (Gen2,3)								
447	21.45512529 µs			SLOS1 (Gen2,3)							
448	21.48605864 µs		SLOS1 (Gen2,3)								
449	21.55765071 µs			SLOS1 (Gen2,3)							
450	21.58858205 µs		SLOS1 (Gen2,3)								
451	21.66016715 µs			SLOS1 (Gen2,3)							
452	21.69109542 µs		SLOS1 (Gen2,3)								
453	21.76267413 µs			SLOS1 (Gen2,3)							
454	21.79360084 µs		SLOS1 (Gen2,3)								
455	21.86517784 µs			SLOS1 (Gen2,3)							
456	21.89610486 µs		SLOS1 (Gen2,3)								
457	21.96768444 µs			SLOS1 (Gen2,3)							
458	21.99861163 µs		SLOS1 (Gen2,3)								
459	22.07018461 µs			SLOS1 (Gen2,3)							
460	22.10110788 µs		SLOS1 (Gen2,3)								
461	22.17267862 µs			SLOS1 (Gen2,3)							
462	22.20360309 µs		SLOS1 (Gen2,3)								
463	22.27517561 µs			SLOS1 (Gen2,3)							٦
464	22.30609856 µs		SLOS1 (Gen2,3)								Ÿ

Figure 3: USB4 High Speed TX decode with time-correlated analog signal

### Recommended Oscilloscope

The N7019A Active Link Fixture is compatible with the Infiniium series oscilloscope.

Data rate	Minimum bandwidth	Minimum channels	Description
20 Gb/s	25 GHz	4	Z- series, UXR oscilloscopes

### **Ordering Information**

Model number	Description	Note
N7019A	Type-C Active Link Fixture	Required

## Learn more at: www.keysight.com

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at: www.keysight.com/find/contactus

