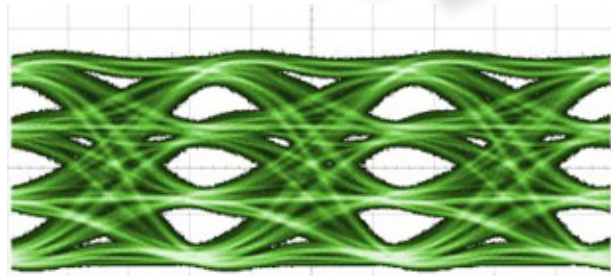
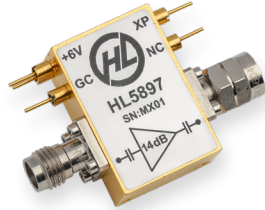




OPEN YOUR EYES: COMPONENTS DESIGNED FOR HIGH-SPEED DATA

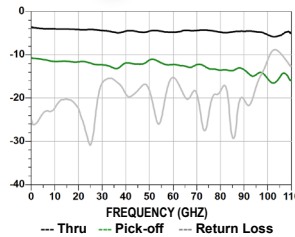
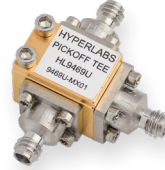
HL5897 Linear Amp (63 GHz)

- Exceptionally flat bandwidth (48 kHz to 63 GHz)
- 14 dB gain
- Optimized as data driver
- 112 Gbps PAM4 signaling
- Small form factor
- Single 6 V power supply



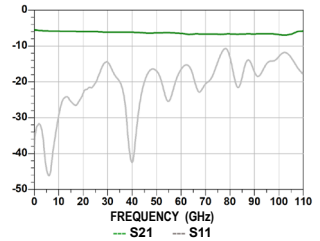
NEW: HL9469 Pick-off Tee

- Ultra-broadband (DC to 110 GHz)
- Suitable for 224 Gbps PAM4
- Available in matched pairs

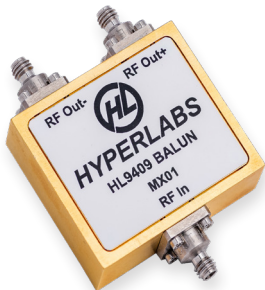


NEW: HL9429 Attenuators

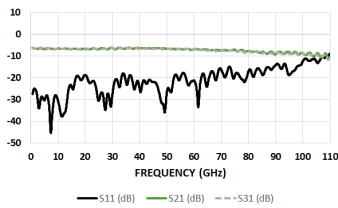
- Ultra-broadband (DC to 110 GHz)
- Exceptional price for performance
- 3, 6, and 10 dB options available



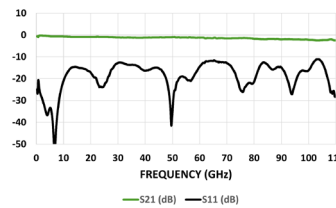
ULTRA-BROADBAND PARTS FOR 112 & 224 GBPS PAM4 APPLICATIONS



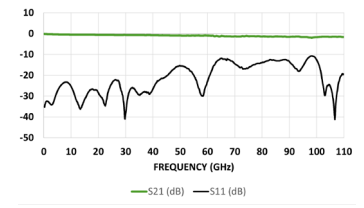
HL9409 BALUN (500 kHz-100 GHz)



HL9449 BIAS TEE (160 kHz-110 GHz)



HL9439 DC BLOCK (160 kHz-110 GHz)



Also Available:

- HL9479 2-Way Power Divider from DC to 110 GHz (3 dB)
- New HL942x Inverters from 150 kHz up to 100 GHz (3 dB)
- New HL952x Terminations up to 110 GHz
- HL945x Transition Time Converters up to 50 GHz (7 ps)

Visit our website for baluns, pick-off tees, power dividers, risetime filters, DC blocks, amplifiers, and more!



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We offer some of the broadest band components on the market.

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HL COLORADO

315 W South Boulder Rd.
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Louisville, CO 80027

AMPLIFIERS		F-MIN	F-MAX
HL5867	Linear Amplifier; 13 dB gain; 12.5 dBm max. output	35 kHz	30 GHz
HL5877	Limiting Amplifier, 27 dB gain, 1.05 Vp-p max. output	35 kHz	27 GHz
HL5887	Linear Amplifier; 15 dB gain; 15.5 dBm max. output	35 kHz	40 GHz
HL5897	Linear Amplifier; 13 dB gain; 17.3 dBm max. output	70 kHz	65 GHz

BALUNS - 1 Watt Max Input		F-MIN	F-MAX
HL9401	Match: ± 0.1 dB (20 GHz), $\pm 6^\circ$ (20 GHz); 6 dB I.L.	100 MHz	20 GHz
HL9402	Match: ± 0.1 dB, $\pm 4^\circ$ (20 GHz); 6 dB I.L.	500 kHz	26.5 GHz
HL9404	Match: ± 0.1 dB, $\pm 4^\circ$ (20 GHz); 6 dB I.L.	500 kHz	40 GHz
HL9405	Match: ± 0.1 dB, $\pm 8^\circ$ (40 GHz); 6 dB I.L.	500 kHz	50 GHz
HL9407	Match: ± 0.25 dB (>50 GHz), $\pm 8^\circ$ (40 GHz); 6 dB I.L.	500 kHz	67 GHz
HL9408	Match: ± 0.5 dB (>50 GHz), $\pm 15^\circ$ (40 GHz); 6.5 dB I.L.	500 kHz	85 GHz
HL9409	Match: ± 0.5 dB (>50 GHz), $\pm 15^\circ$ (80 GHz); 6.5 dB I.L.	500 kHz	100 GHz

INTEGRATED BALUNS - DC Block at all ports / 1W Max Input		F-MIN	F-MAX
HL9502	Match: ± 0.1 dB, $\pm 4^\circ$ (20 GHz); 6 dB I.L.	500 kHz	26.5 GHz
HL9504	Match: ± 0.1 dB, $\pm 4^\circ$ (20 GHz); 6 dB I.L.	500 kHz	40 GHz
HL9505	Match: ± 0.25 dB (>40GHz), $\pm 8^\circ$ (40 GHz); 6 dB I.L.	500 kHz	50 GHz

PULSE INVERTERS		F-MIN	F-MAX
HL9417	2 dB I.L.	150 kHz	67 GHz
HL9419	2 dB I.L.	150 kHz	100 GHz

DC BLOCKS		F-MIN	F-MAX
HL9434	Match: ± 0.1 dB, $\pm 4^\circ$ (20 GHz); <1 dB I.L. (40 GHz)	35 kHz	40 GHz
HL9435	Match: ± 0.1 dB, $\pm 4^\circ$ (20 GHz); <1 dB I.L. (50 GHz)	35 kHz	50 GHz
HL9437	Match: ± 0.1 dB, $\pm 4^\circ$ (20 GHz); <1 dB I.L. (67 GHz)	35 kHz	67 GHz
HL9438	Match: ± 0.1 dB, (<110 GHz), $\pm 4^\circ$ (40 GHz); <1.5 dB I.L. (85 GHz)	160 kHz	95 GHz
HL9439	Match: ± 0.1 dB, (<110 GHz), $\pm 4^\circ$ (40 GHz); <1.5 dB I.L. (85 GHz)	160 kHz	110 GHz
HL8334	Removes DC Bias; Match: ± 0.1 dB, $\pm 4^\circ$ (40 GHz); <0.75 dB I.L.	20 kHz	40 GHz

BIAS TEES (SMA port or pins available for DC bias)	F-MIN	F-MAX	
HL9444	175 mA IMAX; Match: ± 0.1 dB, $\pm 4^\circ$ (40 GHz); <1.55 dB I.L. (40 GHz)	35 kHz	40 GHz
HL9445	175 mA IMAX; Match: ± 0.1 dB, $\pm 4^\circ$ (40 GHz); <1.55 dB I.L. (50 GHz)	35 kHz	50 GHz
HL9447	175 mA IMAX; Match: ± 0.1 dB, $\pm 4^\circ$ (40 GHz); <1.55 dB I.L. (67 GHz)	35 kHz	67 GHz
HL9448	175 mA IMAX; Match: ± 0.1 dB, $\pm 4^\circ$ (40 GHz); <2.5 dB I.L. (95 GHz)	160 kHz	95 GHz
HL9449	175 mA IMAX; Match: ± 0.1 dB, $\pm 4^\circ$ (40 GHz); <2.5 dB I.L. (110 GHz)	160 kHz	110 GHz
HL9544	400 mA IMAX; Match: ± 0.1 dB, $\pm 4^\circ$ (40 GHz); <1.5 dB I.L. (40 GHz)	50 kHz	40 GHz
HL9545	400 mA IMAX; Match: ± 0.1 dB, $\pm 4^\circ$ (40 GHz); <1.5 dB I.L. (50 GHz)	50 kHz	50 GHz
HL9547	400 mA IMAX; Match: ± 0.1 dB, $\pm 4^\circ$ (40 GHz); <1.5 dB I.L. (67 GHz)	50 kHz	67 GHz
HL9644	1000 mA IMAX; Match: ± 0.1 dB, $\pm 4^\circ$ (40 GHz); <2.3 dB I.L. (40 GHz)	125 kHz	40 GHz
HL9645	1000 mA IMAX; Match: ± 0.1 dB, $\pm 4^\circ$ (40 GHz); <2.3 dB I.L. (50 GHz)	125 kHz	50 GHz
HL9647	1000 mA IMAX; Match: ± 0.1 dB, $\pm 4^\circ$ (40 GHz); <2.3 dB I.L. (67 GHz)	125 kHz	67 GHz
HL8x4x	<i>Above Bias Tees also available with an SMA Sense Port</i>		
HL8342	500 mA IMAX; Match: ± 0.1 dB, $\pm 4^\circ$ (20 GHz); <0.5 dB I.L.	5 kHz	28 GHz
HL8442	2000 mA IMAX; Match: ± 0.2 dB, $\pm 4^\circ$ (15 GHz); <0.75 dB I.L.	7.5 kHz	23 GHz

TRANSITION TIME CONVERTERS / LOW PASS FILTERS		F-MAX
HL9450	Specify Maximum (-3 dB) Frequency and/or Risetime ($T_r > 350$ ps)	< 1 GHz
HL9452	Specify Maximum (-3 dB) Frequency and/or Risetime (350 ps $> T_r > 24$ ps)	1 - 15 GHz
HL9454	Specify Maximum (-3 dB) Frequency and/or Risetime (24 ps $> T_r > 12.5$ ps)	15 - 28 GHz
HL9457	Specify Maximum (-3 dB) Frequency and/or Risetime ($T_r < 12.5$ ps)	> 28 GHz

INSTRUMENTATION		
HL1101	TDR: Single Ended, 200ps Rise Time, USB Powered (Single Channel)	
HL1302	Cable Skew Tester (2 channel), 1-200 ps Delay/Skew, 0.5 ps Resolution	
HL2202	TDR / Signal Path Analyzer: Differential, 35 ps Risetime, Signal Path Analyzer (Single Channel)	
HL2204	TDR / Signal Path Analyzer: Differential, 35 ps Risetime, Signal Path Analyzer (Dual Channel)	
HL9101	Impulse Generator: Triggerable, 100 ps Rise Time, 100 ps Fall Time, 200 ps Pulse Width, Trigger Rate 10 Hz - 50 MHz	
HL9201	Impulse Generator: Triggerable, 50 ps Rise Time, 50 ps Fall Time, 70 ps Pulse Width, Trigger Rate 10 Hz - 10 MHz	
HL9600	Calibration Standard Substrate. Includes Single-Ended and Differential SOLT Traces. Intended for use with HYPERLABS' Instrument Products	

PICK-OFF TEES (standard)		F-MIN	F-MAX
HL9562	Match: ± 0.1 dB, $\pm 2^\circ$ (10 GHz); I.L. (see Note 5)	DC	26.5 GHz
HL9564	Match: ± 0.1 dB, $\pm 2^\circ$ (10 GHz); I.L. (see Note 6)	DC	40 GHz
HL9565	Match: ± 0.1 dB, $\pm 2^\circ$ (10 GHz); I.L. (see Note 6)	DC	50 GHz

PICK-OFF TEES - Z Matched - 50 Ω all ports		F-MIN	F-MAX
HL9462	Match: ± 0.1 dB, $\pm 5^\circ$ (20 GHz); I.L. 3.5 dB thru, 10.5 dB p.off	DC	26.5 GHz
HL9464	Match: ± 0.1 dB, $\pm 5^\circ$ (20 GHz); I.L. 3.5 dB thru, 10.5 dB p.off	DC	40 GHz
HL9465	Match: ± 0.1 dB, $\pm 5^\circ$ (20 GHz); I.L. 3.5 dB thru, 10.5 dB p.off	DC	50 GHz
HL9467	Match: ± 0.25 dB, $\pm 5^\circ$ (20 GHz); I.L. 4 dB thru, 10 dB p.off	DC	67 GHz
HL5567	100Gb/s PAM4 Encoder. 2:1 Weighted Summing. (ref: HL9467)	DC	67 GHz
HL9469	Match: ± 0.5 dB, $\pm 5^\circ$ (60 GHz); I.L. 4.5 dB thru, 11 dB p.off	DC	110GHz

POWER DIVIDERS (2:1)		F-MIN	F-MAX
HL9472	Match: ± 0.5 dB, $\pm 4^\circ$ (20 GHz); 6.0 dB I.L.AC; 6 dB I.L.DC	DC	26.5 GHz
HL9474	Match: ± 0.5 dB, $\pm 8^\circ$ (40 GHz); 6.0 dB I.L.AC; 6 dB I.L.DC	DC	40 GHz
HL9475	Match: ± 0.5 dB, $\pm 8^\circ$ (40 GHz); 6.0 dB I.L.AC; 6 dB I.L.DC	DC	50 GHz
HL9477	Match: ± 0.5 dB, $\pm 8^\circ$ (40 GHz); 6.0 dB I.L.AC; 6 dB I.L.DC	DC	67 GHz
HL9479	Match: ± 0.5 dB, $\pm 10^\circ$ (80 GHz); 6.0 dB I.L.AC; 7 dB I.L.DC	DC	110 GHz

POWER DIVIDERS (4:1)		F-MIN	F-MAX
HL9572	Match: ± 0.5 dB, $\pm 4^\circ$ (20 GHz); 12 dB I.L.AC; 6 dB I.L.DC	DC	26.5 GHz
HL9574	Match: ± 0.5 dB, $\pm 8^\circ$ (40 GHz); 12 dB I.L.AC; 6 dB I.L.DC	DC	40 GHz
HL9575	Match: ± 0.5 dB, $\pm 8^\circ$ (40 GHz); 12 dB I.L.AC; 6 dB I.L.DC	DC	50 GHz
HL9577	Match: ± 0.5 dB, $\pm 8^\circ$ (40 GHz); 12 dB I.L.AC; 6 dB I.L.DC	DC	67 GHz

POWER SPLITTERS (2:1)		F-MIN	F-MAX
HL9482	Match: ± 0.1 dB, $\pm 4^\circ$ (20 GHz); 6.0 dB I.L.AC; 6 dB I.L.DC	DC	26.5 GHz
HL9484	Match: ± 0.1 dB, $\pm 8^\circ$ (40 GHz); 6.0 dB I.L.AC; 6 dB I.L.DC	DC	40 GHz
HL9485	Match: ± 0.1 dB, $\pm 8^\circ$ (40 GHz); 6.0 dB I.L.AC; 6 dB I.L.DC	DC	50 GHz
HL9487	Match: ± 0.1 dB, $\pm 8^\circ$ (40 GHz); 6.0 dB I.L.AC; 6 dB I.L.DC	DC	67 GHz

ATTENUATORS (opt. -3, -6, or -10)		F-MIN	F-MAX
HL9427	Match: ± 0.2 dB, $\pm 2^\circ$ (10 GHz); I.L. 3, 6, or 10 dB	DC	70 GHz
HL9429	Match: ± 0.5 dB, $\pm 2^\circ$ (10 GHz); I.L. 3, 6, or 10 dB	DC	110 GHz

TERMINATIONS (50 Ω)		F-MIN	F-MAX
HL9527	1.85mm connector	DC	70 GHz
HL9529	1.0 mm connector	DC	110 GHz

SURFACE MOUNT COMPONENTS		F-MIN	F-MAX
HL7041	SMD Bias Tee (R-handed): 175 mA IMAX, <2.5 dB I.L. (20GHz)	35 MHz	30 GHz
HL7042	SMD Bias Tee (L-handed): 175 mA IMAX, <2.5 dB I.L. (20GHz)	35 MHz	30 GHz
HL7061	SMD Pick-Off Tee - Z-Matched: I.L. 4 dB thru, 13 dB p.off	DC	30 GHz
HL7062	SMD Pick-Off Tee: I.L. 1 dB thru, 15 dB p.off	DC	30 GHz
HL7071	SMD Power Divider: Match: ± 0.3 dB, $\pm 6^\circ$ (20 GHz)	DC	30 GHz
HL9491	SMD Balun: Match: ± 0.4 dB (20 GHz), $\pm 5^\circ$ (10 GHz); 7 dB I.L.	1 MHz	20 GHz
HL9492	SMD Balun: Match: ± 0.4 dB (20 GHz), $\pm 5^\circ$ (10 GHz); 8 dB I.L.	3 MHz	30 GHz

SAMPLERS		F-MIN	F-MAX
HL9333 [*]	Sampler / Harmonic Mixer IC	DC	15/19 GHz

NOTE: Some specifications may vary depending on the selected option(s). Please visit www.hyperlabs.com for datasheets and full specifications.