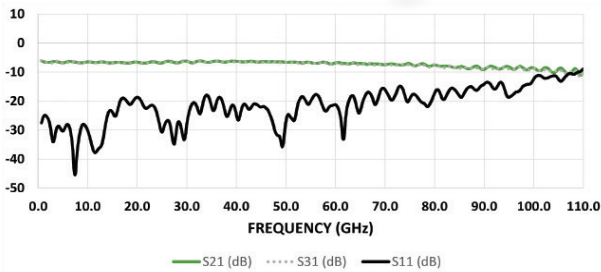
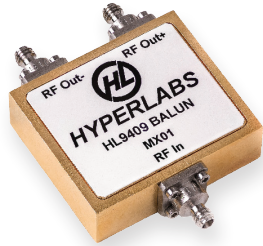


BROADBAND BALUNS, BIAS TEES AND DC BLOCKS TO 110 GHz

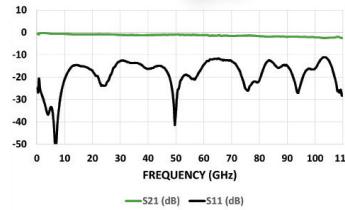
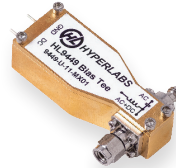
HL9409 Balun

- Industry-leading bandwidth (-3 dB from 500 kHz to 100 GHz)
- Best amplitude (± 0.5 dB) and phase match on the market



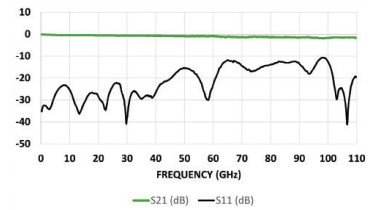
HL9449 Bias Tee

- Ultra-broadband (160 kHz to 110 GHz)
- Unparalleled passband flatness



HL9439 DC Block

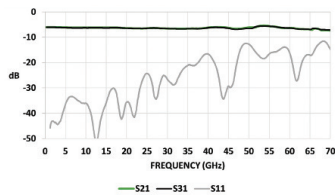
- Ultra-broadband (160 kHz to 110 GHz)
- Exceptional price for performance



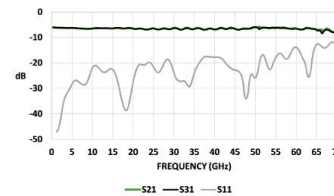
NEW: POWER DIVIDERS AND POWER SPLITTERS TO 67 GHz



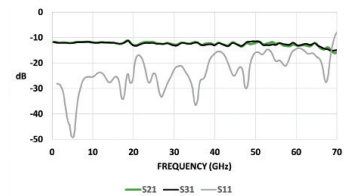
HL9477 2-WAY POWER DIVIDER



HL9487 POWER SPLITTER



HL9577 4-WAY POWER DIVIDER



Available Models:

- HL9477 2-Way Power Divider from DC to 67+ GHz (-1.5 dB)
- HL9487 Power Splitter from DC to 67+ GHz (-1.5 dB)
- HL9577 4-Way Power Divider from DC to 67+ GHz (-3 dB)

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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Louisville, CO 80027

AMPLIFIERS		F-MIN	F-MAX
HL5867	Linear Amplifier; 13 dB gain; 12.5 dB max. output	35 kHz	30 GHz
HL5877	Limiting Amplifier; 27 dB gain; 1.05 Vp-p max. output	35 kHz	27 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

DC BLOCKS		F-MIN	F-MAX
HL9434 ¹	Match: ± 0.1 dB, $\pm 4^\circ$ (20 GHz); <1 dB I.L. (40 GHz)	Note 1	40 GHz
HL9435 ¹	Match: ± 0.1 dB, $\pm 4^\circ$ (20 GHz); <1 dB I.L. (50 GHz)	Note 1	50 GHz
HL9437 ¹	Match: ± 0.1 dB, $\pm 4^\circ$ (20 GHz); <1 dB I.L. (67 GHz)	Note 1	67 GHz
HL9438 ²	Match: ± 0.1 dB, (<110 GHz), $\pm 4^\circ$ (40 GHz); <1.5 dB I.L. (85 GHz)	Note 2	95 GHz
HL9439 ²	Match: ± 0.1 dB, (<110 GHz), $\pm 4^\circ$ (40 GHz); <1.5 dB I.L. (85 GHz)	Note 2	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		F-MIN	F-MAX
HL9444 ¹	175 mA IMAX; Match: ± 0.1 dB, $\pm 4^\circ$ (40 GHz); <1.55 dB I.L. (40 GHz)	Note 1	40 GHz
HL9445 ¹	175 mA IMAX; Match: ± 0.1 dB, $\pm 4^\circ$ (40 GHz); <1.55 dB I.L. (50 GHz)	Note 1	50 GHz
HL9447 ¹	175 mA IMAX; Match: ± 0.1 dB, $\pm 4^\circ$ (40 GHz); <1.55 dB I.L. (67 GHz)	Note 1	67 GHz
HL9448 ²	175 mA IMAX; Match: ± 0.1 dB, $\pm 4^\circ$ (40 GHz); <2.5 dB I.L. (95 GHz)	Note 2	95 GHz
HL9449 ²	175 mA IMAX; Match: ± 0.1 dB, $\pm 4^\circ$ (40 GHz); <2.5 dB I.L. (110 GHz)	Note 2	110 GHz
HL9544 ³	400 mA IMAX; Match: ± 0.1 dB, $\pm 4^\circ$ (40 GHz); <1.5 dB I.L. (40 GHz)	Note 1	40 GHz
HL9545 ³	400 mA IMAX; Match: ± 0.1 dB, $\pm 4^\circ$ (40 GHz); <1.5 dB I.L. (50 GHz)	Note 1	50 GHz
HL9547 ³	400 mA IMAX; Match: ± 0.1 dB, $\pm 4^\circ$ (40 GHz); <1.5 dB I.L. (67 GHz)	Note 1	67 GHz
HL9644 ⁴	1000 mA IMAX; Match: ± 0.1 dB, $\pm 4^\circ$ (40 GHz); <2.3 dB I.L. (40 GHz)	Note 4	40 GHz
HL9645 ⁴	1000 mA IMAX; Match: ± 0.1 dB, $\pm 4^\circ$ (40 GHz); <2.3 dB I.L. (50 GHz)	Note 4	50 GHz
HL9647 ⁴	1000 mA IMAX; Match: ± 0.1 dB, $\pm 4^\circ$ (40 GHz); <2.3 dB I.L. (67 GHz)	Note 4	67 GHz
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 ⁵	Match: ± 0.1 dB, $\pm 2^\circ$ (10 GHz); I.L. (see Note 5)	DC	26.5 GHz
HL9564 ⁶	Match: ± 0.1 dB, $\pm 2^\circ$ (10 GHz); I.L. (see Note 6)	DC	40 GHz
HL9565 ⁶	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

POWER DIVIDERS (2:1)		F-MIN	F-MAX
HL9472	Match: ± 0.5 dB, $\pm 4^\circ$ (20 GHz); 6.02 dB I.L.AC; 6 dB I.L.DC	DC	26.5 GHz
HL9474	Match: ± 0.5 dB, $\pm 8^\circ$ (40 GHz); 6.02 dB I.L.AC; 6 dB I.L.DC	DC	40 GHz
HL9475	Match: ± 0.5 dB, $\pm 8^\circ$ (40 GHz); 6.02 dB I.L.AC; 6 dB I.L.DC	DC	50 GHz
HL9477	Match: ± 0.5 dB, $\pm 8^\circ$ (40 GHz); 6.02 dB I.L.AC; 6 dB I.L.DC	DC	67 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		F-MIN	F-MAX
HL9482	Match: ± 0.1 dB, $\pm 4^\circ$ (20 GHz); 6.02 dB I.L.AC; 6 dB I.L.DC	DC	26.5 GHz
HL9484	Match: ± 0.1 dB, $\pm 8^\circ$ (40 GHz); 6.02 dB I.L.AC; 6 dB I.L.DC	DC	40 GHz
HL9485	Match: ± 0.1 dB, $\pm 8^\circ$ (40 GHz); 6.02 dB I.L.AC; 6 dB I.L.DC	DC	50 GHz
HL9487	Match: ± 0.1 dB, $\pm 8^\circ$ (40 GHz); 6.02 dB I.L.AC; 6 dB I.L.DC	DC	67 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 ⁷	SMD Pick-Off Tee - Z-Matched: I.L. 4 dB thru, 13 dB p.off	DC	30 GHz
HL7062 ⁷	SMD Pick-Off Tee: I.L. 1 dB thru, 15 dB p.off	DC	30 GHz
HL7071 ⁷	SMD Power Divider: Match: ± 0.3 dB, $\pm 6^\circ$ (20 GHz)	DC	30 GHz
HL9491 ⁷	SMD Balun: Match: ± 0.4 dB (20 GHz), $\pm 5^\circ$ (10 GHz); 7 dB I.L.	1 MHz	20 GHz
HL9492 ⁷	SMD Balun: Match: ± 0.4 dB (20 GHz), $\pm 5^\circ$ (10 GHz); 8 dB I.L.	3 MHz	30 GHz

Refer to Note 7 (below) for Evaluation Board Options

SAMPLERS		F-MIN	F-MAX
HL9333 ⁸	Sampler / Harmonic Mixer IC	DC	15/19 GHz

Refer to Note 8 (below) for Evaluation Board Options

¹ 11 V Option (-11): fLOW = 35 kHz; 30 V Option (-30): fLOW = 70 kHz

² 11 V Option (-11): fLOW = 160 kHz; 30 V Option (-30): fLOW = 200 kHz

³ 11 V Option (-11): fLOW = 50 kHz; 30 V Option (-30): fLOW = 75 kHz

⁴ 11 V Option (-11): fLOW = 125 kHz; 30 V Option (-30): fLOW = 150 kHz

⁵ 14 dB Option (-14): I.L = 1.1 dB thru, 14.5 dB pick-off; 20 dB Option (-20): I.L = 0.4 dB thru, 20.5 dB pick-off

⁶ 14 dB Option (-14): I.L = 0.9 dB thru, 14.5 dB pick-off; 20 dB Option (-20): I.L = 0.45 dB thru, 20.5 dB pick-off

⁷ Evaluation Boards Available: add -EVAL to Part No. (HL7061, HL7062, HL7071, HL9491 only)

⁸ Evaluation Boards Available: add -EVAL-MA to Part No. for MACOM Balun (2 GHz fmin)
add -EVAL-HL to Part No. for HyperLabs Balun (1 MHz fmin)