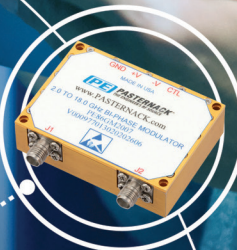




The Engineer's Immediate RF Source



2022
Mixers, Modulators,
Multipliers &
Dividers

Broad Selection of Ready-to-Ship Mixers, Modulators, Multipliers and Dividers

Our lines of coaxial packaged mixers, multipliers, and dividers cover select frequency bands from DC to 110 GHz, and available in coaxial and waveguide packaged configurations. These frequency conversion products are most commonly deployed in a variety of applications involving radar, communication systems, and test instrumentation.

Pasternack mixer models are available in double balanced, triple balanced, and IQ designs with LO drive levels ranging from 10 to 19 dBm. Frequency multipliers and dividers cover 0.5 to 110 GHz. Waveguide Active Multipliers are available in 2x, 4x, and 6x versions with input frequencies ranging from 10 to 20 GHz. Waveguide converter mixers are available in both up and down converter models with DC to 18 GHz IF frequency bands. These frequency conversion products are an essential element in the signal processing system chain, with the key benefit of reducing complexity and cost.

Our comprehensive and growing portfolio of mixers, modulators, multipliers, dividers, and waveguide converter mixers are all available from stock. Some models have added features that include field replaceable coaxial connectors, active LO drives, and integrated waveguide ports. All models cover full operational temperature ranges in rugged package designs and several are MIL-SPEC compliant with environmental test conditions for hermeticity and temperature cycle for high-reliability applications.

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Frequency Mixers

Doubled and Triple Balanced

PE P/N	Type	RF Range (GHz)	LO Range (GHz)	IF Range (GHz)	LO Power (dBm)	Conversion Loss (dB)	LO to RF Isolation (dB)	LO to IF Isolation (dB)	P1dB (dBm)	Connector	ECCN
PE86X1013 	Double Balanced	0.5 MHz - 500 MHz	0.5 MHz - 500 MHz	DC - 500 MHz	10	6.8	55	45		SMA	EAR99
PE86X1020 	Double Balanced	1 MHz - 2.7	1 MHz - 2.7	1 MHz - 2	10	7	39	36		SMA	EAR99
PE86X1021 	Double Balanced	1 MHz - 2.7	1 MHz - 2.7	1 MHz - 2	17	7	38	31		SMA	EAR99
PE86X1014 	Double Balanced	5 MHz - 1	5 MHz - 1	DC - 1	7	7	47	45		SMA	EAR99
PE86X1016 	Double Balanced	5 MHz - 1	5 MHz - 1	DC - 1	13	7	39	30		SMA	EAR99
PE86X1018 	Double Balanced	5 MHz - 1.5	5 MHz - 1.5	DC - 1	7	7.5	40	30		SMA	EAR99
PE86X1022 	Double Balanced	5 MHz - 3.5	5 MHz - 3.5	5 MHz - 2.5	13	8	33	28		SMA	EAR99
PE86X1023 	Double Balanced	5 MHz - 4.2	5 MHz - 4.2	5 MHz - 3.5	13	9.8	29	26		SMA	EAR99
PE86X1015 	Double Balanced	10 MHz - 1	10 MHz - 1	DC - 800 MHz	4	7.2	60	33		SMA	EAR99
PE86X1017 	Double Balanced	10 MHz - 1.2	10 MHz - 1.2	DC - 1.2	13	8	45	42		SMA	EAR99
PE86X1019 	Double Balanced	40 MHz - 2.5	40 MHz - 2.5	DC - 1	13	8	37	35		SMA	EAR99
PE86X1024 	Double Balanced	800 MHz - 4.2	800 MHz - 4.2	DC - 800 MHz	13	9	35	18		SMA	EAR99
PE8650 	Double Balanced	2 - 8	2 - 8	DC - 1.5	10	5.5	35	25	4	SMA	EAR99
PE8652 	Double Balanced	2 - 18	2 - 18	DC - 600 MHz	10	6.5	28	25	4	SMA	EAR99
PE86X1026 	Double Balanced	2.25 - 18	2.25 - 18	DC - 3	13	11	35	20		SMA	EAR99

Doubled and Tripled Balanced Continued

PE P/N	Type	RF Range (GHz)	LO Range (GHz)	IF Range (GHz)	LO Power (dBm)	Conversion Loss (dB)	LO to RF Isolation (dB)	LO to IF Isolation (dB)	P1dB (dBm)	Connector	ECCN
PE86X1025 	Double Balanced	2.5 - 6	2.5 - 6	DC - 1.5	17	8.7	28	14		SMA	EAR99
PE86X1027 	Double Balanced	3 - 10	3 - 10	DC - 4	17	9	45	45	15	SMA	EAR99
PE8653 	Double Balanced	5 - 18	5 - 18	DC - 4	10	6.2	35	30	4	SMA	EAR99
PE86X1006 	Double Balanced	5 - 20	5 - 20	DC - 3	20	10	30	17		SMA	EAR99
PE86X1008 	Double Balanced	5 - 20	5 - 20	DC - 3	20	10	30	17		SMA	EAR99
PE86X1007 	Double Balanced	6 - 18	6 - 18	DC - 3	6	7.5	23	20		SMA	EAR99
PE86X1028 	Double Balanced	6 - 26	6 - 26	DC - 8	13	10	37	37	11	SMA	EAR99
PE86X1003 	Double Balanced	7 - 14	7 - 14	DC - 5	13					SMA	EAR99
PE86X1029 	Double Balanced	7 - 34	7 - 34	DC - 8	15	11	35	30	13	2.92mm	EAR99
PE86X1009 	Double Balanced	7 - 43	7 - 43	DC - 10	13	9	35	35		2.92mm	EAR99
PE86X1004 	Double Balanced	11 - 20	11 - 20	DC - 6	13					2.92mm	EAR99
PE86X1030 	Double Balanced	16 - 30	16 - 30	DC - 8	13	9	40	32	13	2.92mm	EAR99
PE86X1000 	Double Balanced	16 - 32	16 - 32	DC - 8	13					2.92mm	EAR99
PE86X1002 	Double Balanced	23 - 37	23 - 37	DC - 13	13	9	35	35		2.92mm	EAR99
PE86X1031 	Double Balanced	24 - 32	24 - 32	DC - 8	13	10.5	38	40	13	2.92mm	EAR99

Doubled and Tripled Balanced Continued

PE P/N	Type	RF Range (GHz)	LO Range (GHz)	IF Range (GHz)	LO Power (dBm)	Conversion Loss (dB)	LO to RF Isolation (dB)	LO to IF Isolation (dB)	P1dB (dBm)	Connector	ECCN
PE86X1001 	Double Balanced	24 - 38	24 - 38	DC - 8	13	9	35	40		2.92mm	EAR99
PE86X1010 	Double Balanced	24 - 40	24 - 40	DC - 18	13	8	35	28		2.92mm	EAR99
PE86X1032 	Triple Balanced	2 - 18	2 - 18	1 - 6		8	25	30		SMA	EAR99
PE8654 	Triple Balanced	6 - 18	6 - 18	1.5 - 8	10	7	27	25	4	SMA	EAR99

IQ

PE P/N	Type	RF Range (GHz)	LO Range (GHz)	IF Range (GHz)	LO Power (dBm)	Conversion Loss (dB)	LO to RF Isolation (dB)	LO to IF Isolation (dB)	P1dB (dBm)	Connector	ECCN
PE86X9000 	IQ	4 - 8.5	4 - 8.5	DC - 3.5	15					SMA	EAR99
PE86X9001 	IQ	6 - 10	6 - 10	DC - 3.5	19	7.5	45	25	17	SMA	EAR99
PE86X9002 	IQ	8.5 - 13.5	8.5 - 13.5	DC - 2	19	8	38	25	17	SMA	EAR99
PE86X9003 	IQ	11 - 16	11 - 16	DC - 3.5	19	9	35	25		SMA	EAR99
PE86X9004 	IQ	15 - 23	15 - 23	DC - 3.5	17	8	35	22	15	SMA	EAR99
PE86X9005 	IQ	20 - 31	20 - 31	DC - 4.5	17	10	42	30	17	2.92mm	EAR99
PE86X9006 	IQ	30 - 38	30 - 38	DC - 3.5	17					2.92mm	EAR99

Bi-Phase Modulators

PE P/N	Frequency Band (GHz)	Insertion Loss (dB)	Switching Speed (nsec)	Phase State (On/Off)	VSWR	RF Input Power (CW) (dBm)	Max Peak RF Input Power (1 μ sec) (W)	Bias Voltage (Volts)	Connectors	ECCN
PE86GM2000 	0.5 - 1	2.5	10	0°/180°	2:1	+20	0.5	+5 / -5	SMA Female	EAR99
PE86GM2001 	1 - 2	3	30	0°/180°	2:1	+20	0.5	+12 / -12	SMA Female	EAR99
PE86GM2002 	2 - 4	2.5	75	0°/180°	1.5:1	+20	0.5	+5 / -5	SMA Female	EAR99
PE86GM2003 	2 - 6	1.7	50	0°/180°	1.8:1	+27	0.5	+5 / -15	SMA Female	EAR99
PE86GM2004 	4 - 8	2.5	30	0°/180°	2:1	+20	0.5	+5 / -5	SMA Female	EAR99
PE86GM2005 	6 - 12	2.5	15	0°/180°	2:1	+20	0.5	+5 / -5	SMA Female	EAR99
PE86GM2006 	8 - 18	3	75	0°/180°	2:1	+20	0.5	+5 / -5	SMA Female	EAR99
PE86GM2007 	2 - 18	3.5	35	0°/180°	1.7:1	+20	0.5	+5 / -12	SMA Female	EAR99
PE86GM2008 	26.5 - 40	5.5	50	0°/180°	2:1	+20	0.5	+5 / -5	2.92mm	EAR99

Frequency Dividers

PE P/N	Frequency (GHz)	Divide-By Prescaler	Typ Output Power (dBm)	Phase Noise @100 KHz (dBc/Hz)	Max Input Power (CW) (dBm)	DC Bias (V/mA)	Connector	ECCN
PE88D3000 	0.1 - 7	3	-1	-150	12	+12 / 70	SMA - SMA	3A001.A. 11.B
PE88D25000 	0.1 - 7	5	-1	-150	12	+12 / 80	SMA - SMA	3A001.A. 11.B
PE88D15000 	0.1 - 7	15	-1	-150	10	+12 / 150	SMA - SMA	3A001.A. 11.B
PE88D8003 	0.1 - 12	8	-7	-150	10	+12 / 75	SMA - SMA	3A001.A. 11.B

Frequency Dividers Continued

PE P/N	Frequency (GHz)	Divide-By Prescaler	Typ Output Power (dBm)	Phase Noise @100 KHz (dBc/Hz)	Max Input Power (CW) (dBm)	DC Bias (V/mA)	Connector	ECCN
PE88D24000 	0.1 - 12	24	-1	-147	10	+12 / 140	SMA - SMA	3A001.A.11.B
PE88D40000 	0.1 - 12	40	-1	-147	10	+12 / 150	SMA - SMA	3A001.A.11.B
PE88D1001 	0.1 - 12.5	10	-1	-144	10	+12 / 200	SMA - SMA	3A001.A.11.B
PE88D4003 	0.1 - 13	4	5	-151	10	+12 / 120	SMA - SMA	3A001.A.11.B
PE88D12000 	0.1 - 13	12	-2	-145	10	+12 / 185	SMA - SMA	3A001.A.11.B
PE88D20000 	0.1 - 13	20	-1	-145	10	+12 / 195	SMA - SMA	3A001.A.11.B
PE88D5001 	0.1 - 15	5	5	-153	10	+5 / 205	SMA - SMA	3A001.A.11.B
PE88D6000 	0.1 - 15	6	5	-153	10	+5 / 205	SMA - SMA	3A001.A.11.B
PE88D7000 	0.1 - 15	7	5	-153	10	+5 / 205	SMA - SMA	3A001.A.11.B
PE88D9000 	0.1 - 15	9	5	-153	10	+5 / 205	SMA - SMA	3A001.A.11.B
PE88D2002 	0.1 - 20	2	5	-153	10	+5 / 160	SMA - SMA	3A001.A.11.B
PE88D4002 	0.1 - 20	4	5	-153	10	+5 / 170	SMA - SMA	3A001.A.11.B
PE88D8002 	0.1 - 20	8	5	-153	10	+5 / 175	SMA - SMA	3A001.A.11.B
PE88D1002 	0.2 - 6	10	-2	-144	10	+12 / 100	SMA - SMA	3A001.A.11.B
PE88D20001 	0.2 - 6	20	2	-144	10	+12 / 95	SMA - SMA	3A001.A.11.B

Frequency Dividers Continued

PE P/N	Frequency (GHz)	Divide-By Prescaler	Typ Output Power (dBm)	Phase Noise @100 KHz (dBc/Hz)	Max Input Power (CW) (dBm)	DC Bias (V/mA)	Connector	ECCN
PE88D16000 	0.4 - 4	16	-2	-144	10	+12 / 70	SMA - SMA	3A001.A.11.B
PE88D32000 	0.4 - 4	32	1	-144	10	+12 / 70	SMA - SMA	3A001.A.11.B
PE88D5000 	0.5 - 8	5	-1	-155	10	+5 / 80	SMA - SMA	3A001.A.11.B
PE88D2001 	0.5 - 18	2	-4	-147	10	+12 / 85	SMA - SMA	3A001.A.11.B
PE88D4000 	0.5 - 18	4	-4	-150	10	+5 / 93	SMA - SMA	3A001.A.11.B
PE88D4001 	0.5 - 18	4	-4	-147	10	+12 / 110	SMA - SMA	3A001.A.11.B
PE88D8001 	0.5 - 18	8	-4	-147	10	+12 / 110	SMA - SMA	3A001.A.11.B
PE88D1000 	0.5 - 18	10	-1	-155	10	+5 / 152	SMA - SMA	3A001.A.11.B

Frequency Multipliers

Active

PE P/N	Type	Input Frequency (GHz)	Output Frequency (GHz)	CW Input Power (dBm)	Fund. Iso. Typ (dB)	Conversion Gain (dB)	DC Voltage (Volts)	Female In/Out Connector	ECCN
PE88X2015 	Triplers	250 - 350	0.75 - 1.05	-3	40	7	12	SMA	EAR99
PE88X2016 	Triplers	320 - 450	0.96 - 1.35	-3	30	6	12	SMA	EAR99
PE88X2017 	Triplers	450 - 600	1.35 - 1.8	-3	35	9	12	SMA	EAR99
PE88X2018 	Triplers	600 - 750	1.8 - 2.25	-3	30	4	12	SMA	EAR99
PE88X2019 	Triplers	700 - 1,000	2.1 - 3	0	25	12	12	SMA	EAR99

Active Frequency Multipliers Continued

PE P/N	Type	Input Frequency (GHz)	Output Frequency (GHz)	CW Input Power (dBm)	Fund. Iso. Typ (dB)	Conversion Gain (dB)	DC Voltage (Volts)	Female In/Out Connector	ECCN
PE88X2020 	Triplers	0.95 - 1.5	2.85 - 4.5	0	20	9	12	SMA	EAR99
PE88X2003 	Doublers	4 - 10.5	8 - 21	6		8	12	SMA	EAR99
PE88X2000 	Doublers	9 - 14.5	18 - 29	3	20	13	5	2.92mm	EAR99
PE88X2001 	Doublers	12 - 16.5	24 - 33	3	20	14	5	2.92mm	EAR99
PE88X2002 	Doublers	16 - 23	32 - 46	3	20	10	5	2.92mm	EAR99

Passive Doublers

PE P/N	Input Frequency (GHz)	Output Frequency (GHz)	Input Drive Power (dBm)	Conversion Loss (dB)	Fund. Iso. Typ (dB)	Female In/Out Connector	ECCN
PE88X2010 	0.01 - 1	0.02 - 2	16	12	35	SMA	EAR99
PE88X2011 	0.9 - 1.8	1.8 - 4	18	14	35	SMA	EAR99
PE88X2012 	1.25 - 3	2.5 - 6	18	15	25	SMA	EAR99
PE8600 	1.5 - 5	3 - 10	13	8.5		SMA	EAR99
PE88X2013 	2 - 4	4 - 8	18	14	25	SMA	EAR99
PE8601 	2 - 6	4 - 12	13	11		SMA	EAR99
PE88X2014 	4 - 8	8 - 16	18	17	25	SMA	EAR99
PE8602 	4 - 9	8 - 18	13	10	25	SMA	EAR99

Passive Doubler Frequency Multipliers Continued

PE P/N	Input Frequency (GHz)	Output Frequency (GHz)	Input Drive Power (dBm)	Conversion Loss (dB)	Fund. Iso. Typ (dB)	Female In/Out Connector	ECCN
PE8603 	9 - 13	18 - 26	13	10	25	SMA	EAR99

Waveguides

Waveguide Active Frequency Multipliers

PE P/N	Waveguide Type	Input Frequency Range (GHz)	Output Frequency Range (GHz)	Typ Output Power (dBm)	Typ Harmonics	Max DC Voltage (V)	Typ DC Current (mA)	Flange Type	ECCN
PE88X2021 	WR-28	13.25 - 20	26.5 - 40	+22	-15	8	350	UG-599/U	EAR99
PE88X2022 	WR-19	10 - 15	40 - 60	+10	-15	8	150	UG-383/U-M	EAR99
PE88X2023 	WR-15	12.5 - 18.75	50 - 75	+15	-15	8	275	UG-385/U	EAR99
PE88X2024 	WR-12	10 - 15	60 - 90	+10	-15	8	350	UG-387/U	EAR99
PE88X2025 	WR-12	10 - 15	60 - 90	+20	-15	8	575	UG-387/U	3A001.B.4.E.2
PE88X2026 	WR-10	12.5 - 18.33	75 - 110	+10	-15	8	375	UG-387/U-M	3A001.B.4.E.3

Waveguide Converters/Mixers

PE P/N	RF/LO Frequency Range (GHz)	IF Frequency Range (GHz)	Conversion Loss (dB)	Waveguide Type	Connector	ECCN
PE13U1005 	26.5 - 40	DC - 18 GHz	6	WR-28 UG-599/U	SMA Female	EAR99
PE13U1004 	33 - 50	DC - 18 GHz	7	WR-22 UG-383/U	SMA Female	EAR99
PE13U1003 	40 - 60	DC - 18 GHz	7	WR-19 UG-383/U	SMA Female	EAR99
PE13U1002 	50 - 75	DC - 18 GHz	8	WR-15 UG-385/U	SMA Female	EAR99

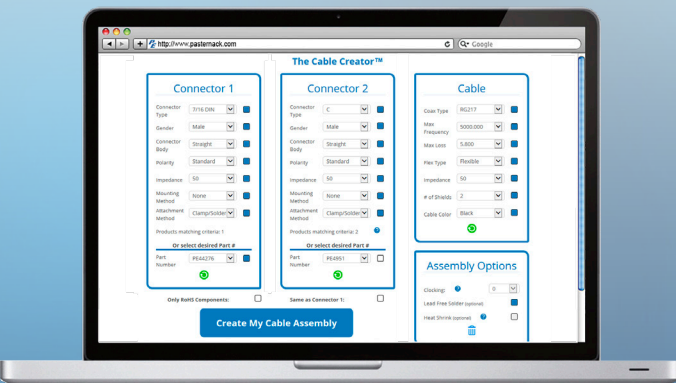
Waveguide Converters/Mixers Continued

PE P/N	RF/LO Frequency Range (GHz)	IF Frequency Range (GHz)	Conversion Loss (dB)	Waveguide Type	Connector	ECCN
PE13U1001 	60 - 90	DC - 18 GHz	9	WR-12 UG-387/U	SMA Female	EAR99
PE13U1000 	75 - 110	DC - 18 GHz	9	WR-10 UG-387/U	SMA Female	EAR99
PE12D1005 	26.5 - 40	DC - 18 GHz	6	WR-28 UG-599/U	SMA Female	EAR99
PE12D1004 	33 - 50	DC - 18 GHz	7	WR-22 UG-383/U	SMA Female	EAR99
PE12D1002 	50 - 75	DC - 18 GHz	8	WR-15 UG-385/U	SMA Female	EAR99
PE12D1001 	60 - 90	DC - 18 GHz	9	WR-12 UG-387/U	SMA Female	EAR99
PE12D1000 	75 - 110	DC - 18 GHz	9	WR-10 UG-387/U-Mod	SMA Female	EAR99

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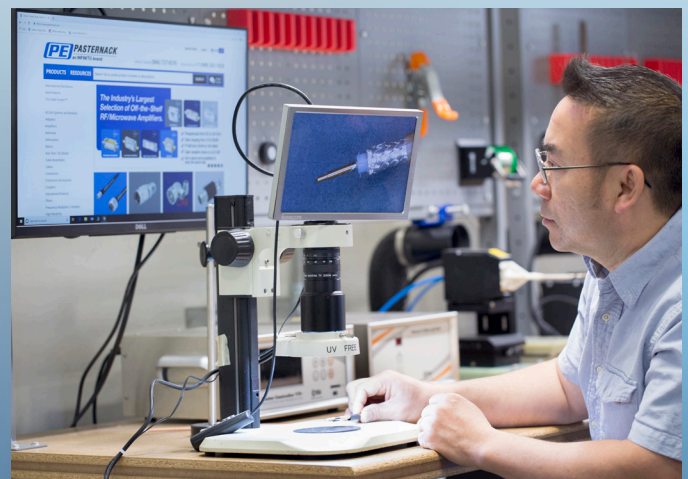
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