

# Frequency Mixer

# JMS-1LH+

## Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB)			RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)			RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+5dBm (dB)		
		@LO (dBm)					@LO (dBm)					@LO (dBm)		
		+7	+10	+13			+7	+10	+13			+7	+10	+13
5.0	35.0	6.14	5.87	5.71	10.1	40.1	21.57	24.56	28.68	10.1	40.1	0.92	0.68	0.47
10.0	40.0	6.47	6.17	5.99	49.8	79.8	20.21	22.22	23.03	49.8	79.8	1.18	0.93	0.74
49.8	79.8	6.06	5.71	5.60	89.5	119.5	21.22	22.99	23.67	89.5	119.5	1.23	0.91	0.72
89.5	119.5	6.04	5.70	5.61	129.2	159.2	22.02	21.38	27.95	129.2	159.2	1.22	0.87	0.70
129.2	159.2	6.05	5.77	5.69	168.9	198.9	20.01	22.54	21.67	168.9	198.9	1.17	0.85	0.68
168.9	198.9	6.04	5.78	5.70	208.6	238.6	19.80	24.62	20.50	208.6	238.6	1.25	0.88	0.71
208.6	238.6	6.02	5.78	5.71	248.3	278.3	22.66	19.82	17.34	248.3	278.3	1.20	0.88	0.71
248.3	278.3	6.06	5.80	5.72	287.9	317.9	20.64	19.50	18.48	287.9	317.9	1.17	0.87	0.73
287.9	317.9	6.08	5.85	5.75	327.6	357.6	23.59	17.91	17.61	327.6	357.6	1.22	0.88	0.73
327.6	357.6	6.07	5.85	5.75	367.3	397.3	16.56	16.06	17.93	367.3	397.3	1.22	0.94	0.78
367.3	397.3	6.07	5.81	5.71	407.0	437.0	14.17	13.67	15.16	407.0	437.0	1.15	0.89	0.78
446.7	476.7	6.27	5.98	5.82	446.7	476.7	15.83	14.72	15.49	446.7	476.7	1.05	0.81	0.73
486.4	516.4	6.24	5.92	5.79	486.4	516.4	19.97	17.79	21.11	486.4	516.4	1.18	0.89	0.78
526.1	556.1	6.18	5.87	5.75	526.1	556.1	27.65	19.59	21.73	526.1	556.1	1.25	0.91	0.80
565.8	595.8	6.19	5.90	5.79	565.8	595.8	22.09	19.42	19.37	565.8	595.8	1.45	1.03	0.83
585.6	615.6	6.25	5.95	5.85	585.6	615.6	21.23	18.56	19.53	585.6	615.6	1.46	1.03	0.83
625.3	655.3	6.38	6.08	5.96	625.3	655.3	14.44	16.86	19.07	625.3	655.3	1.65	1.21	0.96
645.2	675.2	6.48	6.18	6.04	645.2	675.2	11.95	15.45	19.17	645.2	675.2	1.62	1.18	0.94
684.9	714.9	6.65	6.33	6.18	684.9	714.9	8.70	11.27	15.87	684.9	714.9	1.74	1.31	1.08
704.7	734.7	6.77	6.44	6.26	704.7	734.7	7.89	9.64	13.34	704.7	734.7	1.69	1.29	1.07
744.4	774.4	6.90	6.57	6.36	744.4	774.4	7.17	8.21	10.61	744.4	774.4	1.71	1.37	1.12
764.3	794.3	6.93	6.59	6.37	764.3	794.3	7.33	8.45	10.63	764.3	794.3	1.70	1.37	1.15
803.9	833.9	7.00	6.60	6.38	803.9	833.9	7.60	9.21	11.71	803.9	833.9	1.75	1.39	1.16
823.8	853.8	7.00	6.59	6.37	863.5	893.5	8.92	11.36	14.59	863.5	893.5	1.85	1.48	1.26
863.5	893.5	7.01	6.61	6.41	883.3	913.3	9.45	12.12	15.61	883.3	913.3	2.00	1.60	1.38
883.3	913.3	6.96	6.57	6.38	923.0	953.0	10.48	13.36	17.50	923.0	953.0	2.06	1.68	1.44
923.0	953.0	7.07	6.68	6.48	942.9	972.9	11.19	14.20	19.49	942.9	972.9	2.15	1.76	1.53
942.9	972.9	7.12	6.73	6.53	982.6	1012.6	13.69	18.65	20.50	982.6	1012.6	2.19	1.83	1.59
1002.4	1032.4	7.45	6.98	6.79	1002.4	1032.4	15.40	22.17	17.55	1002.4	1032.4	2.16	1.85	1.64
1042.1	1072.1	7.76	7.23	6.98	1042.1	1072.1	15.20	15.75	15.74	1042.1	1072.1	2.19	1.90	1.70
1061.9	1091.9	7.97	7.43	7.15	1061.9	1091.9	13.68	14.43	15.83	1061.9	1091.9	2.11	1.88	1.69
1101.6	1131.6	8.39	7.78	7.46	1101.6	1131.6	11.76	13.20	15.09	1101.6	1131.6	2.18	2.01	1.84
1121.5	1151.5	8.67	8.03	7.70	1121.5	1151.5	11.33	13.65	15.99	1121.5	1151.5	2.10	1.97	1.81
1161.2	1191.2	9.23	8.50	8.13	1161.2	1191.2	10.92	15.01	18.99	1161.2	1191.2	2.01	1.96	1.83
1181.0	1211.0	9.55	8.77	8.39	1181.0	1211.0	11.49	16.15	18.07	1181.0	1211.0	1.98	1.97	1.87
1220.7	1250.7	10.16	9.34	8.95	1220.7	1250.7	13.62	16.20	15.38	1220.7	1250.7	1.80	1.87	1.80
1240.6	1270.6	10.53	9.71	9.30	1240.6	1270.6	15.31	14.87	14.71	1240.6	1270.6	1.71	1.76	1.73
1280.3	1310.3	11.33	10.58	10.18	1280.3	1310.3	16.62	13.80	14.03	1280.3	1310.3	1.37	1.41	1.45
1300.1	1330.1	11.73	11.03	10.63	1300.1	1330.1	16.01	13.72	14.28	1300.1	1330.1	1.24	1.25	1.30



# Frequency Mixer

# JMS-1LH+

## Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=250.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=10.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=500.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+10			+10			+10
240.0	10.1	5.90	10.0	20.1	5.75	490.0	10.1	6.02
234.1	16.0	5.88	22.3	32.4	5.65	477.7	22.4	5.99
228.2	21.9	5.85	34.6	44.7	5.64	465.4	34.7	5.95
222.3	27.8	5.85	46.9	57.0	5.68	453.1	47.0	5.92
216.4	33.7	5.85	59.2	69.3	5.66	440.8	59.3	5.95
210.5	39.6	5.84	71.5	81.6	5.72	428.5	71.6	5.85
204.6	45.5	5.84	83.8	93.9	5.72	416.2	83.9	5.82
198.7	51.4	5.80	96.2	106.3	5.71	403.8	96.3	5.79
192.8	57.3	5.81	108.5	118.6	5.72	391.5	108.6	5.74
186.9	63.2	5.77	120.8	130.9	5.71	379.2	120.9	5.73
181.0	69.1	5.80	133.1	143.2	5.71	366.9	133.2	5.72
175.1	75.0	5.81	145.4	155.5	5.76	354.6	145.5	5.69
169.2	80.9	5.77	157.7	167.8	5.79	342.3	157.8	5.70
163.3	86.8	5.77	170.0	180.1	5.79	330.0	170.1	5.71
157.4	92.7	5.76	182.3	192.4	5.81	317.7	182.4	5.71
151.5	98.6	5.72	194.6	204.7	5.80	305.4	194.7	5.71
145.6	104.5	5.75	206.9	217.0	5.82	293.1	207.0	5.69
139.7	110.4	5.72	219.2	229.3	5.83	280.8	219.3	5.70
133.8	116.3	5.72	231.5	241.6	5.83	268.5	231.6	5.73
127.9	122.2	5.67	243.8	253.9	5.85	256.2	243.9	5.74
122.1	128.0	5.66	256.2	266.3	5.88	243.8	256.3	5.76
116.2	133.9	5.68	268.5	278.6	5.88	231.5	268.6	5.79
110.3	139.8	5.72	280.8	290.9	5.89	219.2	280.9	5.77
104.4	145.7	5.70	293.1	303.2	5.92	206.9	293.2	5.78
98.5	151.6	5.71	305.4	315.5	5.93	194.6	305.5	5.76
92.6	157.5	5.70	317.7	327.8	5.98	182.3	317.8	5.74
86.7	163.4	5.70	330.0	340.1	5.98	170.0	330.1	5.74
80.8	169.3	5.71	342.3	352.4	5.96	157.7	342.4	5.75
74.9	175.2	5.71	354.6	364.7	5.96	145.4	354.7	5.77
69.0	181.1	5.71	366.9	377.0	5.97	133.1	367.0	5.80
63.1	187.0	5.69	379.2	389.3	5.97	120.8	379.3	5.80
57.2	192.9	5.70	391.5	401.6	5.96	108.5	391.6	5.81
51.3	198.8	5.70	403.8	413.9	5.94	96.2	403.9	5.84
45.4	204.7	5.73	416.2	426.3	5.96	83.8	416.3	5.86
39.5	210.6	5.74	428.5	438.6	5.99	71.5	428.6	5.90
33.6	216.5	5.74	440.8	450.9	6.03	59.2	440.9	5.94
27.7	222.4	5.73	453.1	463.2	6.04	46.9	453.2	5.93
21.8	228.3	5.75	465.4	475.5	6.03	34.6	465.5	5.96
15.9	234.2	5.78	477.7	487.8	6.01	22.3	477.8	5.96
10.0	240.1	5.89	490.0	500.1	6.02	10.0	490.1	6.09

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## Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+7	+10	+13	+7	+10	+13
5.0	65.11	67.37	69.67	54.46	56.74	57.76
10.0	63.38	65.16	66.06	52.78	52.79	52.34
49.8	60.76	61.31	61.75	48.86	46.92	45.54
89.5	56.64	56.90	57.35	45.82	42.98	41.80
129.2	53.06	53.33	53.81	42.66	40.82	39.44
168.9	50.30	50.64	50.78	41.87	39.38	37.90
208.6	48.10	48.27	48.51	40.87	38.49	36.83
248.3	46.06	46.07	46.08	40.47	37.77	35.75
287.9	44.78	44.70	44.70	39.32	36.82	34.95
327.6	43.04	43.25	43.33	37.84	35.90	34.06
367.3	41.27	41.23	41.61	36.31	34.68	33.00
446.7	40.12	39.88	39.84	32.62	32.68	31.73
486.4	39.67	39.70	39.71	30.90	31.09	30.75
526.1	39.33	39.38	39.07	29.54	29.76	29.40
565.8	38.63	38.47	38.08	28.55	28.55	28.29
585.6	38.29	38.12	37.76	28.43	28.32	27.93
625.3	37.05	37.13	37.10	28.13	27.88	27.17
645.2	36.39	36.71	36.87	27.91	27.97	27.06
684.9	34.75	35.55	36.18	27.29	28.30	27.29
704.7	34.16	35.05	35.92	26.81	28.18	27.43
744.4	33.17	34.33	35.54	25.99	27.82	27.95
764.3	32.99	34.45	35.81	25.73	27.63	27.84
803.9	33.00	34.94	36.74	25.16	26.81	27.02
823.8	33.28	35.56	37.36	24.80	26.19	26.25
863.5	34.86	37.49	38.84	24.12	25.18	25.25
883.3	35.49	37.75	38.53	23.61	24.55	24.65
923.0	36.51	37.78	37.92	22.69	23.68	23.87
942.9	36.03	36.81	36.82	22.45	23.41	23.67
1002.4	33.92	34.02	34.00	22.32	23.15	23.46
1042.1	32.74	32.51	32.39	22.34	23.29	23.68
1061.9	31.89	31.55	31.36	22.41	23.44	23.83
1101.6	30.48	30.27	29.99	22.21	23.70	24.19
1121.5	29.91	29.72	29.26	22.11	23.87	24.44
1161.2	28.85	28.80	28.37	21.96	24.24	25.25
1181.0	28.44	28.47	28.11	21.77	24.29	25.53
1220.7	27.50	27.77	27.51	21.32	24.32	26.15
1240.6	27.15	27.55	27.33	21.24	24.46	26.57
1280.3	26.34	26.85	26.91	20.97	24.48	27.01
1300.1	25.96	26.57	26.69	20.96	24.62	27.43

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+7	+10	+13
10.1	40.1	46.61	45.92	44.89
49.8	79.8	34.42	34.69	34.86
89.5	119.5	30.16	30.53	30.32
129.2	159.2	27.53	27.78	27.80
168.9	198.9	25.79	26.02	26.20
208.6	238.6	24.64	25.11	25.28
248.3	278.3	23.91	24.09	24.36
287.9	317.9	23.84	24.21	24.43
327.6	357.6	23.48	24.21	24.81
367.3	397.3	23.21	24.11	24.83
407.0	437.0	23.43	23.95	24.39
446.7	476.7	24.21	24.39	24.58
486.4	516.4	24.67	25.15	25.69
526.1	556.1	23.07	23.97	24.79
565.8	595.8	20.00	20.62	21.19
585.6	615.6	18.63	19.04	19.45
625.3	655.3	16.62	16.68	16.81
645.2	675.2	15.87	15.84	15.89
684.9	714.9	14.79	14.80	14.85
704.7	734.7	14.35	14.36	14.45
744.4	774.4	13.65	13.60	13.67
764.3	794.3	13.38	13.31	13.35
823.8	853.8	12.66	12.56	12.63
863.5	893.5	12.36	12.35	12.44
883.3	913.3	12.16	12.17	12.25
923.0	953.0	11.92	11.95	12.06
942.9	972.9	11.80	11.83	11.91
982.6	1012.6	11.61	11.70	11.87
1002.4	1032.4	11.52	11.64	11.80
1042.1	1072.1	11.38	11.53	11.67
1061.9	1091.9	11.22	11.42	11.60
1101.6	1131.6	10.93	11.15	11.32
1121.5	1151.5	10.70	10.93	11.14
1161.2	1191.2	10.25	10.45	10.59
1181.0	1211.0	9.96	10.18	10.26
1220.7	1250.7	9.39	9.55	9.58
1240.6	1270.6	9.09	9.20	9.21
1280.3	1310.3	8.54	8.58	8.48
1300.1	1330.1	8.27	8.23	8.19



# Frequency Mixer

# JMS-1LH+

## Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)		
		@LO (dBm)		
		+7	+10	+13
5.0	35.0	1.15	1.16	1.18
10.0	40.0	1.09	1.08	1.11
49.8	79.8	1.05	1.04	1.09
89.5	119.5	1.06	1.03	1.10
129.2	159.2	1.04	1.05	1.10
168.9	198.9	1.03	1.06	1.11
208.6	238.6	1.01	1.08	1.14
248.3	278.3	1.01	1.08	1.14
287.9	317.9	1.03	1.10	1.16
327.6	357.6	1.06	1.14	1.20
367.3	397.3	1.06	1.16	1.23
446.7	476.7	1.11	1.17	1.22
486.4	516.4	1.17	1.24	1.30
526.1	556.1	1.24	1.33	1.38
565.8	595.8	1.29	1.40	1.46
585.6	615.6	1.31	1.42	1.49
625.3	655.3	1.32	1.44	1.51
645.2	675.2	1.31	1.43	1.51
684.9	714.9	1.29	1.40	1.48
704.7	734.7	1.28	1.38	1.45
744.4	774.4	1.26	1.33	1.40
764.3	794.3	1.27	1.33	1.40
803.9	833.9	1.27	1.33	1.39
823.8	853.8	1.30	1.36	1.41
863.5	893.5	1.35	1.41	1.45
883.3	913.3	1.41	1.45	1.49
923.0	953.0	1.54	1.58	1.61
942.9	972.9	1.62	1.66	1.68
982.6	1012.6	1.82	1.85	1.87
1002.4	1032.4	1.94	1.96	1.97
1042.1	1072.1	2.22	2.21	2.21
1061.9	1091.9	2.37	2.34	2.33
1101.6	1131.6	2.67	2.60	2.56
1121.5	1151.5	2.81	2.72	2.67
1161.2	1191.2	3.03	2.92	2.84
1181.0	1211.0	3.12	2.99	2.90
1220.7	1250.7	3.24	3.11	3.02
1240.6	1270.6	3.29	3.16	3.06
1280.3	1310.3	3.35	3.23	3.14
1300.1	1330.1	3.34	3.23	3.14

LO (MHz)	LO VSWR (:1)		
	@LO (dBm)		
	+7	+10	+13
5.0	1.61	2.42	3.53
10.0	1.58	2.33	3.49
49.8	1.64	2.48	3.50
89.5	1.58	2.35	3.30
129.2	1.63	2.44	3.43
168.9	1.58	2.35	3.28
208.6	1.62	2.40	3.37
248.3	1.63	2.41	3.36
287.9	1.63	2.39	3.31
327.6	1.70	2.48	3.44
367.3	1.69	2.44	3.34
446.7	1.77	2.53	3.45
486.4	1.77	2.51	3.41
526.1	1.81	2.54	3.46
565.8	1.85	2.56	3.45
585.6	1.88	2.59	3.47
625.3	1.95	2.65	3.52
645.2	1.97	2.66	3.52
684.9	2.01	2.72	3.56
704.7	2.03	2.74	3.59
744.4	2.03	2.73	3.58
764.3	2.04	2.74	3.59
803.9	2.03	2.72	3.56
823.8	2.00	2.69	3.53
863.5	1.99	2.67	3.52
883.3	1.99	2.68	3.53
923.0	1.99	2.68	3.50
942.9	2.00	2.68	3.50
982.6	2.07	2.73	3.55
1002.4	2.11	2.76	3.56
1042.1	2.15	2.77	3.56
1061.9	2.19	2.81	3.59
1101.6	2.28	2.86	3.62
1121.5	2.30	2.86	3.60
1161.2	2.37	2.92	3.65
1181.0	2.42	2.95	3.68
1220.7	2.48	2.97	3.67
1240.6	2.51	2.99	3.68
1280.3	2.60	3.05	3.73
1300.1	2.65	3.07	3.73

IF (OUT) (MHz)	IF VSWR @LO=500.1MHz (:1)		
	@LO (dBm)		
	+7	+10	+13
5.0	1.31	1.18	1.08
10.0	1.31	1.18	1.08
22.4	1.75	1.52	1.33
34.7	1.65	1.45	1.27
47.0	1.76	1.51	1.35
59.3	1.79	1.52	1.35
71.6	1.81	1.52	1.36
83.9	1.80	1.52	1.36
96.3	1.73	1.49	1.32
108.6	1.70	1.48	1.30
120.9	1.73	1.50	1.32
133.2	1.76	1.52	1.35
145.5	1.78	1.53	1.36
157.8	1.79	1.52	1.36
170.1	1.78	1.53	1.35
182.4	1.78	1.53	1.36
194.7	1.78	1.55	1.36
207.0	1.76	1.54	1.35
219.3	1.76	1.53	1.34
231.6	1.75	1.52	1.34
243.9	1.76	1.52	1.34
256.3	1.77	1.53	1.36
268.6	1.80	1.55	1.37
280.9	1.79	1.55	1.37
293.2	1.76	1.54	1.35
305.5	1.73	1.52	1.33
330.1	1.73	1.52	1.33
342.4	1.75	1.53	1.35
354.7	1.77	1.54	1.35
367.0	1.75	1.53	1.35
379.3	1.75	1.53	1.35
391.6	1.76	1.55	1.36
403.9	1.78	1.57	1.38
416.3	1.78	1.57	1.38
428.6	1.76	1.56	1.37
440.9	1.73	1.54	1.36
453.2	1.75	1.55	1.38
465.5	1.77	1.58	1.41
477.8	1.81	1.61	1.44
490.1	1.82	1.63	1.47

## Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	19	35	24	44	28	44	36	52	43	58
1	-	19	+0	30	12	34	18	32	26	54	46	54
2	93	60	40	71	40	58	40	53	40	51	44	62
3	>100	46	45	51	49	54	44	48	42	55	47	64
4	>100	70	59	71	58	70	57	66	53	64	50	64
5	>100	62	65	68	56	72	54	66	51	67	51	61
6	>100	74	65	86	67	79	69	78	69	77	66	80
7	>100	78	69	82	69	81	75	86	87	77	71	74
8	>100	86	79	82	79	90	77	91	77	87	80	82
9	>100	93	83	84	76	82	76	83	84	81	>94	93
10	>100	>94	92	>94	>94	>94	85	89	85	>94	79	>94
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

### LO HARMONICS ORDER

Test conditions: RF IN: 250.1 MHz; 0.00 dBm.  
 LO IN: 280.01 MHz; +10.00 dBm  
 IF OUT: 29.91 MHz; -5.98 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	10	25	12	29	15	28	20	40	25	41
1	-	19	+0	29	12	32	17	30	25	53	44	45
2	>100	69	45	63	45	67	44	57	43	54	48	71
3	>100	66	64	70	65	>84	58	70	62	79	60	77
4	>100	>84	76	83	77	81	78	>84	75	>84	77	>84
5	>100	>84	>84	>84	>84	>84	83	>84	81	>84	82	>84
6	>100	>84	>84	>84	>84	>84	81	>84	>84	>84	>84	>84
7	>100	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84
8	>100	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84
9	>100	>84	>84	>84	>84	>84	>84	>84	>84	67	>84	>84
10	>100	>84	>84	>84	>84	>84	>84	>84	>84	>84	79	>84
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

### LO HARMONICS ORDER

Test conditions: RF IN: 250.1 MHz; -10.00 dBm.  
 LO IN: 280.01 MHz; +10.00 dBm  
 IF OUT: 29.91 MHz; -15.91 dBm

- Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.  
 2. + entry denotes harmonics are in (dBc) above IF OUTPUT.  
 3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

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