

Frequency Mixer

HJK-ED9419/1

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=20.4MHz (dB)		
		@LO (dBm)		
		+14	+17	+20
46.0	25.6	11.34	10.05	9.37
54.5	34.1	10.17	9.33	8.84
63.0	42.6	9.63	8.98	8.62
71.5	51.1	9.24	8.77	8.49
80.0	59.6	9.05	8.68	8.45
88.5	68.1	8.99	8.66	8.46
97.0	76.6	8.93	8.62	8.44
105.5	85.1	8.82	8.54	8.38
114.0	93.6	8.72	8.45	8.29
122.5	102.1	8.70	8.40	8.23
131.0	110.6	8.69	8.36	8.15
139.5	119.1	8.66	8.33	8.13
148.0	127.6	8.64	8.32	8.13
156.5	136.1	8.71	8.39	8.20
165.0	144.6	8.82	8.50	8.31
173.5	153.1	8.97	8.63	8.42
182.0	161.6	9.10	8.75	8.54
190.5	170.1	9.24	8.87	8.64
199.0	178.6	9.40	8.96	8.70
207.5	187.1	9.52	9.02	8.71
216.0	195.6	9.53	9.01	8.69
224.5	204.1	9.52	8.97	8.64
233.0	212.6	9.51	8.91	8.59
241.5	221.1	9.53	8.91	8.58
250.0	229.6	9.59	8.96	8.63
258.5	238.1	9.65	9.03	8.69
267.0	246.6	9.79	9.12	8.79
275.5	255.1	10.04	9.32	8.97
284.0	263.6	10.25	9.48	9.09
292.5	272.1	10.38	9.55	9.14
301.5	281.1	10.52	9.62	9.18
310.0	289.6	10.61	9.67	9.20
319.0	298.6	10.65	9.65	9.16
327.5	307.1	10.57	9.59	9.10
336.5	316.1	10.56	9.55	9.06
345.0	324.6	10.64	9.60	9.07
354.0	333.6	10.78	9.70	9.15
362.5	342.1	10.90	9.82	9.24
371.5	351.1	11.09	9.93	9.40
380.0	359.6	11.32	10.11	9.54

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)		
		@LO (dBm)		
		+14	+17	+20
46.0	25.6	19.09	22.59	25.33
54.5	34.1	22.35	25.54	28.93
63.0	42.6	24.17	27.20	30.13
71.5	51.1	25.69	28.51	31.08
80.0	59.6	27.38	30.74	33.43
88.5	68.1	29.08	32.89	37.03
97.0	76.6	29.23	32.67	36.33
105.5	85.1	30.37	33.41	36.60
114.0	93.6	30.45	35.38	40.85
122.5	102.1	31.29	35.12	38.69
131.0	110.6	30.14	34.18	38.24
139.5	119.1	29.58	33.59	37.19
148.0	127.6	29.28	32.36	36.28
156.5	136.1	29.33	32.77	37.69
165.0	144.6	29.45	33.10	36.80
173.5	153.1	28.63	32.03	36.76
182.0	161.6	27.90	31.72	35.26
190.5	170.1	27.59	30.97	34.29
199.0	178.6	26.93	30.53	34.33
207.5	187.1	26.20	29.64	33.05
216.0	195.6	25.57	29.07	32.38
224.5	204.1	25.13	28.71	32.17
233.0	212.6	25.07	28.81	31.79
241.5	221.1	24.70	28.44	31.38
250.0	229.6	24.45	27.97	31.03
258.5	238.1	23.98	27.63	30.51
267.0	246.6	23.41	27.20	30.25
275.5	255.1	23.11	26.91	29.80
284.0	263.6	22.79	26.56	29.51
292.5	272.1	22.15	26.10	28.93
301.5	281.1	21.53	25.49	28.46
310.0	289.6	21.49	25.49	28.51
319.0	298.6	21.43	25.26	28.20
327.5	307.1	21.24	25.04	27.87
336.5	316.1	20.81	24.65	27.68
345.0	324.6	20.53	24.43	27.26
354.0	333.6	20.20	23.97	26.99
362.5	342.1	19.82	23.61	26.90
371.5	351.1	19.18	23.07	25.99
380.0	359.6	18.64	22.50	25.39

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+19dBm (dB)		
		@LO (dBm)		
		+14	+17	+20
46.0	25.6	3.05	2.24	1.24
54.5	34.1	2.30	1.38	0.64
63.0	42.6	1.70	0.86	0.36
71.5	51.1	1.30	0.62	0.26
80.0	59.6	0.95	0.43	0.19
88.5	68.1	0.67	0.31	0.15
97.0	76.6	0.50	0.26	0.12
105.5	85.1	0.42	0.20	0.09
114.0	93.6	0.40	0.20	0.09
122.5	102.1	0.41	0.21	0.10
131.0	110.6	0.47	0.24	0.11
139.5	119.1	0.48	0.24	0.12
148.0	127.6	0.53	0.26	0.12
156.5	136.1	0.53	0.27	0.13
165.0	144.6	0.59	0.29	0.14
173.5	153.1	0.63	0.31	0.15
182.0	161.6	0.70	0.34	0.16
190.5	170.1	0.82	0.38	0.18
199.0	178.6	0.95	0.44	0.21
207.5	187.1	1.04	0.52	0.26
216.0	195.6	1.17	0.56	0.28
224.5	204.1	1.23	0.61	0.29
233.0	212.6	1.32	0.62	0.31
241.5	221.1	1.35	0.66	0.34
250.0	229.6	1.41	0.69	0.35
258.5	238.1	1.54	0.74	0.36
267.0	246.6	1.61	0.79	0.38
275.5	255.1	1.67	0.86	0.42
284.0	263.6	1.73	0.93	0.45
292.5	272.1	1.84	1.01	0.49
301.5	281.1	1.92	1.11	0.55
310.0	289.6	1.93	1.15	0.56
319.0	298.6	1.95	1.21	0.61
327.5	307.1	1.98	1.26	0.64
336.5	316.1	2.03	1.29	0.65
345.0	324.6	2.03	1.32	0.65
354.0	333.6	2.00	1.37	0.67
362.5	342.1	2.01	1.39	0.70
371.5	351.1	2.04	1.43	0.75
380.0	359.6	2.06	1.48	0.79

REV. X2

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Frequency Mixer

HJK-ED9419/1

Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=113MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=97.9MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=128.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+17			+17			+17
90.0	23.0	10.36	10.1	108.0	9.12	110.1	18.0	11.41
85.8	27.2	9.82	15.1	113.0	8.71	108.1	20.0	10.87
81.6	31.4	9.35	20.1	118.0	8.66	106.1	22.0	10.42
77.4	35.6	9.03	25.1	123.0	8.46	104.1	24.0	10.06
73.2	39.8	8.88	30.1	128.0	8.53	102.1	26.0	9.78
68.9	44.1	8.70	35.1	133.0	8.47	100.1	28.0	9.56
64.7	48.3	8.66	45.1	143.0	8.38	98.1	30.0	9.33
60.5	52.5	8.54	50.1	148.0	8.52	96.1	32.0	9.31
56.3	56.7	8.34	60.1	158.0	8.39	94.1	34.0	9.18
52.1	60.9	8.47	65.1	163.0	8.48	92.1	36.0	9.05
47.9	65.1	8.48	75.1	173.0	8.61	90.1	38.0	9.00
43.7	69.3	8.35	80.1	178.0	8.59	88.1	40.0	8.85
39.5	73.5	8.30	90.1	188.0	8.83	86.1	42.0	8.77
35.3	77.7	8.33	95.1	193.0	8.75	84.1	44.0	8.67
31.1	81.9	8.38	105.1	203.0	8.79	82.1	46.0	8.61
26.8	86.2	8.22	110.1	208.0	8.80	80.1	48.0	8.51
22.6	90.4	8.34	120.1	218.0	8.73	78.1	50.0	8.59
18.4	94.6	8.45	125.1	223.0	8.81	76.1	52.0	8.62
14.2	98.8	8.69	135.1	233.0	8.90	72.1	56.0	8.47
10.0	103.0	9.11	140.1	238.0	8.91	70.1	58.0	8.46
10.0	123.0	9.17	150.1	248.0	9.06	66.1	62.0	8.34
22.6	135.6	8.45	155.1	253.0	9.08	64.1	64.0	8.27
35.3	148.3	8.44	165.1	263.0	9.25	60.1	68.0	8.15
47.9	160.9	8.53	170.1	268.0	9.15	58.1	70.0	8.45
60.5	173.5	8.46	180.1	278.0	9.28	54.1	74.0	8.06
73.2	186.2	8.65	185.1	283.0	9.36	52.1	76.0	8.14
85.8	198.8	8.84	195.1	293.0	9.39	48.1	80.0	8.15
98.4	211.4	8.81	200.1	298.0	9.49	46.1	82.0	8.09
111.1	224.1	8.74	210.1	308.0	9.40	42.1	86.0	8.12
123.7	236.7	8.84	215.1	313.0	9.41	40.1	88.0	8.14
136.3	249.3	9.03	225.1	323.0	9.51	36.1	92.0	8.12
148.9	261.9	9.10	230.1	328.0	9.54	34.1	94.0	8.04
161.6	274.6	9.29	240.1	338.0	9.74	30.1	98.0	8.24
174.2	287.2	9.39	245.1	343.0	9.78	28.1	100.0	8.14
186.8	299.8	9.39	255.1	353.0	9.93	24.1	104.0	8.18
199.5	312.5	9.52	260.1	358.0	10.19	22.1	106.0	8.30
212.1	325.1	9.50	270.1	368.0	10.33	18.1	110.0	8.39
224.7	337.7	9.65	275.1	373.0	10.52	16.1	112.0	8.50
237.4	350.4	9.82	285.1	383.0	10.55	12.1	116.0	8.59
250.0	363.0	10.11	290.1	388.0	10.57	10.1	118.0	8.94

Frequency Mixer

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Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+14	+17	+20	+14	+17	+20
25.6	63.13	62.71	61.71	64.76	63.13	62.22
34.1	59.43	58.60	58.05	61.09	59.72	59.11
42.6	57.12	56.35	56.05	58.39	57.01	56.37
51.1	55.53	55.19	54.78	55.68	54.77	54.00
59.6	54.24	53.89	53.53	54.31	53.50	52.79
68.1	52.55	52.36	52.07	52.74	52.16	51.61
76.6	51.49	51.40	51.22	52.22	51.63	51.13
85.1	51.66	51.73	51.63	51.26	50.85	50.51
93.6	52.17	52.24	52.23	51.76	51.33	50.98
102.1	52.11	52.23	52.19	51.41	51.10	50.79
110.6	52.22	52.29	52.30	53.24	52.75	52.38
119.1	53.04	53.07	53.06	53.39	52.90	52.59
127.6	54.31	54.48	54.56	55.37	54.87	54.49
136.1	55.22	55.29	55.42	55.65	55.18	54.95
144.6	55.95	56.00	55.96	58.38	57.55	57.15
153.1	57.24	57.26	57.23	59.68	58.77	58.33
161.6	59.30	59.39	59.38	63.21	62.04	61.38
170.1	61.14	61.06	60.94	67.36	65.26	64.51
178.6	62.30	62.06	61.74	72.60	69.61	68.38
187.1	64.67	64.23	63.70	88.38	78.20	75.43
195.6	67.69	66.69	65.86	70.64	73.50	73.19
204.1	71.65	68.76	67.48	64.71	66.83	66.96
212.6	73.18	69.73	68.08	63.24	65.04	65.38
221.1	74.61	69.76	67.79	60.86	62.17	62.38
229.6	73.18	68.99	67.13	60.77	62.06	62.34
238.1	69.08	66.63	65.87	58.14	59.02	59.37
246.6	65.90	64.38	63.76	57.72	58.54	58.87
255.1	64.30	62.97	62.27	55.86	56.47	56.76
263.6	62.65	61.70	61.27	55.37	56.13	56.34
272.1	61.84	61.03	60.74	54.45	55.09	55.32
281.1	60.95	60.36	60.18	53.81	54.41	54.66
289.6	59.49	58.96	58.75	52.80	53.30	53.56
298.6	58.47	58.02	57.82	52.12	52.70	52.96
307.1	57.81	57.46	57.34	51.52	51.96	52.22
316.1	57.21	57.12	57.17	50.93	51.49	51.80
324.6	56.86	56.82	57.04	50.44	51.00	51.29
333.6	55.92	55.73	55.68	49.58	50.12	50.51
342.1	55.31	55.08	54.99	49.06	49.57	49.92
351.1	54.86	54.89	54.93	48.42	49.00	49.39
359.6	54.32	54.55	54.71	48.00	48.64	49.06

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+14	+17	+20
46.0	25.6	34.57	31.37	28.58
54.5	34.1	34.78	31.65	30.02
63.0	42.6	37.14	34.70	33.50
71.5	51.1	37.97	35.77	34.80
80.0	59.6	37.54	35.72	34.52
88.5	68.1	38.32	36.39	34.95
97.0	76.6	39.66	38.41	37.31
105.5	85.1	40.46	39.62	38.81
114.0	93.6	40.37	39.54	38.75
122.5	102.1	41.64	40.90	39.90
131.0	110.6	42.27	41.83	40.95
139.5	119.1	43.09	43.08	42.44
148.0	127.6	43.09	43.27	42.82
156.5	136.1	43.56	43.39	42.72
165.0	144.6	44.09	44.89	44.48
173.5	153.1	46.43	47.61	49.88
182.0	161.6	47.09	48.37	51.75
190.5	170.1	47.53	48.87	50.42
199.0	178.6	47.20	48.18	48.46
207.5	187.1	47.74	49.14	49.86
216.0	195.6	49.28	51.27	52.73
224.5	204.1	49.46	51.26	52.67
233.0	212.6	49.77	51.71	52.89
241.5	221.1	49.45	50.69	51.05
250.0	229.6	49.84	51.62	52.40
258.5	238.1	48.74	50.54	50.39
267.0	246.6	47.80	48.55	44.48
275.5	255.1	47.36	48.86	48.12
284.0	263.6	47.09	48.87	49.62
292.5	272.1	46.73	48.60	49.64
301.0	281.1	45.47	46.76	47.11
310.0	289.6	44.89	46.11	45.63
319.0	298.6	44.53	46.18	46.56
327.5	307.1	44.25	46.11	47.02
336.5	316.1	43.60	45.38	46.28
345.0	324.6	42.58	43.70	43.25
354.0	333.6	41.68	41.83	38.08
362.5	342.1	41.70	42.65	41.75
371.5	351.1	41.42	42.80	43.21
380.0	359.6	40.98	42.43	42.62

Frequency Mixer

HJK-ED9419/1

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)			IF (OUT) (MHz)	IF VSWR @LO=97.6MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+14	+17	+20		+14	+17	+20		+14	+17	+20
46.0	25.6	1.13	1.08	1.12	25.6	3.64	3.64	3.67	10.1	1.10	1.02	1.07
54.5	34.1	1.11	1.17	1.22	34.1	5.09	5.09	5.12	12.1	1.10	1.04	1.09
63.0	42.6	1.18	1.24	1.29	42.6	13.09	13.19	13.29	14.1	1.09	1.05	1.10
71.5	51.1	1.24	1.30	1.35	51.1	115.81	102.19	96.51	16.1	1.09	1.05	1.10
80.0	59.6	1.28	1.33	1.38	59.6	8.01	7.94	7.90	18.1	1.08	1.05	1.11
88.5	68.1	1.31	1.37	1.41	68.1	3.88	3.86	3.84	20.1	1.07	1.04	1.11
97.0	76.6	1.34	1.40	1.44	76.6	2.35	2.34	2.32	22.1	1.08	1.04	1.11
105.5	85.1	1.36	1.42	1.46	85.1	1.60	1.59	1.58	24.1	1.08	1.04	1.11
114.0	93.6	1.38	1.43	1.48	93.6	1.28	1.28	1.27	26.1	1.08	1.04	1.10
122.5	102.1	1.40	1.45	1.49	102.1	1.45	1.45	1.45	28.1	1.09	1.03	1.09
131.0	110.6	1.41	1.47	1.51	110.6	1.84	1.85	1.85	30.1	1.10	1.04	1.09
139.5	119.1	1.43	1.48	1.53	119.1	2.32	2.34	2.34	32.1	1.11	1.04	1.09
148.0	127.6	1.45	1.51	1.55	127.6	2.90	2.92	2.92	34.1	1.12	1.05	1.09
156.5	136.1	1.48	1.53	1.58	136.1	3.60	3.62	3.63	36.1	1.12	1.06	1.09
165.0	144.6	1.50	1.55	1.59	144.6	4.41	4.45	4.45	38.1	1.13	1.07	1.10
173.5	153.1	1.52	1.57	1.61	153.1	5.30	5.36	5.38	40.1	1.14	1.09	1.11
182.0	161.6	1.53	1.58	1.62	161.6	6.35	6.42	6.44	42.1	1.14	1.10	1.13
190.5	170.1	1.54	1.58	1.62	170.1	7.38	7.44	7.47	44.1	1.14	1.11	1.14
199.0	178.6	1.55	1.59	1.62	178.6	8.47	8.60	8.60	46.1	1.14	1.11	1.15
207.5	187.1	1.56	1.59	1.62	187.1	9.58	9.74	9.74	48.1	1.13	1.11	1.16
216.0	195.6	1.57	1.60	1.63	195.6	10.62	10.75	10.82	50.1	1.13	1.11	1.16
224.5	204.1	1.59	1.61	1.64	204.1	11.69	11.85	11.85	52.1	1.12	1.11	1.17
233.0	212.6	1.61	1.63	1.66	212.6	12.80	13.09	13.09	54.1	1.11	1.11	1.17
241.5	221.1	1.63	1.65	1.68	221.1	13.92	14.26	14.26	56.1	1.10	1.11	1.17
250.0	229.6	1.66	1.68	1.70	229.6	15.53	15.81	15.81	58.1	1.10	1.09	1.15
258.5	238.1	1.69	1.70	1.73	238.1	16.89	17.22	17.22	60.1	1.09	1.08	1.15
267.0	246.6	1.73	1.73	1.74	246.6	17.93	18.11	18.30	62.1	1.09	1.07	1.13
275.5	255.1	1.76	1.75	1.76	255.1	19.11	19.54	19.54	64.1	1.10	1.06	1.11
284.0	263.6	1.79	1.77	1.78	263.6	20.22	20.45	20.70	66.1	1.11	1.06	1.10
292.5	272.1	1.82	1.79	1.79	272.1	20.95	21.20	21.46	68.1	1.13	1.07	1.09
301.5	281.1	1.85	1.81	1.80	281.1	21.73	22.00	22.00	70.1	1.15	1.08	1.09
310.0	289.6	1.88	1.83	1.82	289.6	22.29	22.58	22.58	72.1	1.16	1.09	1.10
319.0	298.6	1.90	1.84	1.83	298.6	22.87	23.18	23.18	74.1	1.18	1.11	1.10
327.5	307.1	1.92	1.86	1.84	307.1	23.81	24.14	23.81	76.1	1.19	1.12	1.12
336.5	316.1	1.96	1.89	1.87	316.1	25.19	25.19	25.19	78.1	1.20	1.14	1.14
345.0	324.6	2.00	1.92	1.90	324.6	26.33	26.74	26.74	80.1	1.20	1.16	1.17
354.0	333.6	2.05	1.95	1.92	333.6	27.59	28.03	28.03	82.1	1.22	1.16	1.17
362.5	342.1	2.09	1.99	1.95	342.1	28.49	28.96	28.96	84.1	1.22	1.17	1.18
371.5	351.1	2.14	2.03	1.99	351.1	28.96	28.96	29.46	86.1	1.21	1.17	1.18
380.0	359.6	2.19	2.06	2.01	359.6	28.49	28.96	28.96	87.1	1.21	1.17	1.19

REV. X2

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Harmonics Tables

RF HARMONICS ORDER	(-dBm)											
	(-dBc)											
0	-	-	24	21	31	31	35	37	38	41	40	45
1	-	34	+0	55	11	58	16	63	20	66	24	68
2	76	74	57	61	53	58	52	56	53	55	52	54
3	>90	78	71	73	63	74	63	75	63	74	62	73
4	>90	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
5	>90	>81	>81	>81	>81	>81	79	>81	79	>81	>81	>81
6	>90	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
7	>90	>81	>81	>81	>81	>81	>81	>81	>81	80	>81	>81
8	>90	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
9	>90	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
10	>90	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81	>81
RF CAL 0 1 2 3 4 5 6 7 8 9 10												

LO HARMONICS ORDER

Test conditions: RF IN: 113 MHz; 0.00 dBm.
LO IN: 92.6 MHz; +17.00 dBm
IF OUT: 20.4 MHz; -8.7 dBm

RF HARMONICS ORDER	(-dBm)											
	(-dBc)											
0	-	-	24	31	37	41	37	43	37	43	37	44
1	-	34	+0	53	11	57	17	53	22	52	26	52
2	56	64	46	50	42	47	41	46	42	45	41	45
3	85	67	55	62	49	60	47	59	47	60	47	60
4	>90	85	73	75	70	74	71	77	76	79	79	82
5	>90	78	73	76	70	75	67	75	66	73	65	73
6	>90	79	78	80	79	80	79	80	81	78	78	80
7	>90	84	78	86	79	86	78	84	75	83	75	84
8	>90	86	85	87	87	>91	86	87	86	89	85	86
9	>90	>91	85	>91	85	>91	86	>91	87	>91	85	91
10	>90	>91	>91	>91	>91	>91	90	>91	>91	>91	>91	>91
RF CAL 0 1 2 3 4 5 6 7 8 9 10												

LO HARMONICS ORDER

Test conditions: RF IN: 113 MHz; 10.00 dBm.
LO IN: 92.6 MHz; +17.00 dBm
IF OUT: 20.4 MHz; 1.26 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.