

Frequency Mixer

HJK-ED10960/1

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=10MHz (dB)			RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)			RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+15dBm (dB)		
		@LO (dBm)					@LO (dBm)					@LO (dBm)		
+11	+14	+17	+11	+14	+17	+11	+14	+17						
12.1	22.1	6.89	6.61	6.44	12.1	22.1	33.10	40.32	35.99	12.1	22.1	0.22	0.21	0.20
14.1	24.1	7.01	6.74	6.55	14.1	24.1	33.23	38.01	36.37	14.1	24.1	0.20	0.19	0.23
16.1	26.1	7.06	6.76	6.57	16.1	26.1	31.90	35.52	34.18	16.1	26.1	0.18	0.19	0.24
18.1	28.1	7.10	6.80	6.59	18.1	28.1	30.79	34.36	35.49	18.1	28.1	0.16	0.20	0.24
20.1	30.1	7.06	6.75	6.55	20.1	30.1	30.53	33.30	35.50	20.1	30.1	0.15	0.18	0.22
22.1	32.1	7.11	6.81	6.61	22.1	32.1	29.32	32.75	35.83	22.1	32.1	0.12	0.17	0.21
24.1	34.1	7.15	6.85	6.66	24.1	34.1	29.68	32.28	33.87	24.1	34.1	0.15	0.19	0.23
26.1	36.1	7.19	6.91	6.72	26.1	36.1	29.56	32.16	32.74	26.1	36.1	0.16	0.20	0.23
28.1	38.1	7.27	7.01	6.83	28.1	38.1	29.92	32.56	33.79	28.1	38.1	0.12	0.13	0.15
30.1	40.1	7.33	7.10	6.96	30.1	40.1	30.51	33.41	35.47	30.1	40.1	0.13	0.13	0.13
32.1	42.1	7.42	7.23	7.13	32.1	42.1	30.30	33.00	37.00	32.1	42.1	0.15	0.14	0.13
34.1	44.1	7.53	7.38	7.32	34.1	44.1	29.33	32.12	35.62	34.1	44.1	0.18	0.15	0.12
36.1	46.1	7.65	7.53	7.50	36.1	46.1	28.64	31.16	34.76	36.1	46.1	0.20	0.16	0.13
38.1	48.1	7.79	7.69	7.69	38.1	48.1	27.65	29.50	32.59	38.1	48.1	0.22	0.17	0.14
40.1	50.1	7.94	7.85	7.86	40.1	50.1	27.09	28.89	32.74	40.1	50.1	0.23	0.18	0.14
42.1	52.1	8.12	8.03	8.04	42.1	52.1	26.63	28.31	30.94	42.1	52.1	0.23	0.19	0.16
44.1	54.1	8.33	8.24	8.24	44.1	54.1	26.36	27.94	29.94	44.1	54.1	0.23	0.19	0.16
46.1	56.1	8.57	8.48	8.47	46.1	56.1	26.66	28.11	29.73	46.1	56.1	0.21	0.19	0.17
48.1	58.1	8.82	8.73	8.71	48.1	58.1	26.86	28.44	29.54	48.1	58.1	0.19	0.17	0.17
50.1	60.1	8.97	8.90	8.87	50.1	60.1	27.37	29.47	30.58	50.1	60.1	0.17	0.16	0.16
52.1	62.1	9.28	9.24	9.22	52.1	62.1	28.41	30.94	31.36	52.1	62.1	0.15	0.13	0.14
54.1	64.1	9.57	9.55	9.55	54.1	64.1	29.43	33.71	31.91	54.1	64.1	0.12	0.12	0.12
56.1	66.1	9.84	9.85	9.90	56.1	66.1	30.45	34.74	32.14	56.1	66.1	0.11	0.10	0.10
58.1	68.1	10.10	10.16	10.24	58.1	68.1	31.95	33.43	31.10	58.1	68.1	0.09	0.08	0.08
59.1	69.1	10.24	10.30	10.40	59.1	69.1	32.69	33.48	30.64	59.1	69.1	0.09	0.08	0.08
61.1	71.1	10.46	10.54	10.68	61.1	71.1	34.76	31.48	30.14	61.1	71.1	0.08	0.07	0.07
62.1	72.1	10.56	10.65	10.79	62.1	72.1	35.19	31.22	30.38	62.1	72.1	0.09	0.07	0.08
64.1	74.1	10.70	10.80	10.96	64.1	74.1	35.94	31.21	30.50	64.1	74.1	0.09	0.08	0.08
65.1	75.1	10.77	10.87	11.03	65.1	75.1	35.36	31.40	30.49	65.1	75.1	0.10	0.09	0.09
67.1	77.1	10.89	10.98	11.15	67.1	77.1	33.97	31.38	30.70	67.1	77.1	0.11	0.09	0.09
68.1	78.1	10.95	11.03	11.20	68.1	78.1	33.63	31.45	31.02	68.1	78.1	0.11	0.10	0.09
70.1	80.1	11.05	11.13	11.27	70.1	80.1	32.80	31.46	30.92	70.1	80.1	0.12	0.10	0.09
71.1	81.1	11.10	11.17	11.31	71.1	81.1	32.92	31.80	31.48	71.1	81.1	0.11	0.10	0.08
73.1	83.1	11.18	11.23	11.34	73.1	83.1	31.95	31.90	31.50	73.1	83.1	0.13	0.10	0.08
74.1	84.1	11.22	11.25	11.35	74.1	84.1	31.60	32.06	31.87	74.1	84.1	0.13	0.10	0.08
76.1	86.1	11.28	11.28	11.34	76.1	86.1	31.02	32.44	31.68	76.1	86.1	0.14	0.10	0.08
77.1	87.1	11.32	11.30	11.33	77.1	87.1	30.62	32.07	31.37	77.1	87.1	0.14	0.11	0.09
79.1	89.1	11.37	11.32	11.32	79.1	89.1	29.33	32.72	32.40	79.1	89.1	0.16	0.12	0.10
80.1	90.1	11.40	11.34	11.32	80.1	90.1	28.78	32.82	32.59	80.1	90.1	0.16	0.12	0.10

REV. X2

HJK-ED10960/1

101012

Page 1 of 5



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Frequency Mixer

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Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=21.4MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=16.4MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=26.4MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+14			+14			+14
11.3	10.1	6.43	10.0	26.4	6.78	16.4	10.0	6.28
11.2	10.2	6.45	12.0	28.4	6.47	16.2	10.2	6.28
11.2	10.2	6.47	14.0	30.4	6.55	16.0	10.4	6.28
11.1	10.3	6.49	16.0	32.4	6.46	15.8	10.6	6.26
11.0	10.4	6.53	18.0	34.4	6.50	15.6	10.8	6.24
11.0	10.4	6.54	20.0	36.4	6.74	15.4	11.0	6.22
10.9	10.5	6.56	22.0	38.4	6.85	15.2	11.2	6.20
10.8	10.6	6.59	24.0	40.4	7.00	15.0	11.4	6.20
10.8	10.6	6.55	26.0	42.4	7.20	14.8	11.6	6.24
10.7	10.7	6.46	28.0	44.4	7.41	14.6	11.8	6.28
10.6	10.8	6.64	30.0	46.4	7.50	14.4	12.0	6.32
10.5	10.9	6.59	32.0	48.4	7.64	14.3	12.1	6.34
10.5	10.9	6.58	34.0	50.4	7.80	14.1	12.3	6.33
10.4	11.0	6.58	36.0	52.4	7.93	14.0	12.4	6.33
10.3	11.1	6.59	38.0	54.4	8.00	13.8	12.6	6.31
10.3	11.1	6.61	40.0	56.4	8.15	13.7	12.7	6.31
10.2	11.2	6.63	42.0	58.4	8.36	13.5	12.9	6.34
10.1	11.3	6.64	44.0	60.4	8.50	13.4	13.0	6.37
10.1	11.3	6.68	46.0	62.4	8.76	13.1	13.3	6.53
10.0	11.4	6.71	48.0	64.4	8.99	13.0	13.4	6.37
10.0	31.4	6.81	50.0	66.4	9.21	12.8	13.6	6.38
13.1	34.5	6.57	52.0	68.4	9.51	12.7	13.7	6.40
16.2	37.6	6.55	54.0	70.4	9.69	12.5	13.9	6.44
19.3	40.7	6.75	56.0	72.4	9.91	12.4	14.0	6.46
22.4	43.8	7.03	58.0	74.4	10.11	12.2	14.2	6.48
25.4	46.8	7.23	59.0	75.4	10.19	12.1	14.3	6.47
28.5	49.9	7.45	61.0	77.4	10.34	11.9	14.5	6.47
31.6	53.0	7.59	62.0	78.4	10.43	11.8	14.6	6.50
34.7	56.1	7.81	64.0	80.4	10.56	11.6	14.8	6.55
37.8	59.2	8.04	65.0	81.4	10.54	11.5	14.9	6.57
40.9	62.3	8.35	67.0	83.4	10.66	11.3	15.1	6.62
44.0	65.4	8.77	68.0	84.4	10.63	11.2	15.2	6.65
47.1	68.5	9.23	70.0	86.4	10.77	11.0	15.4	6.71
50.2	71.6	9.65	71.0	87.4	10.69	10.9	15.5	6.72
53.3	74.7	10.07	73.0	89.4	10.69	10.7	15.7	6.73
56.3	77.7	10.34	74.0	90.4	10.67	10.6	15.8	6.74
59.4	80.8	10.58	76.0	92.4	10.68	10.4	16.0	6.75
62.5	83.9	10.75	77.0	93.4	10.69	10.3	16.1	6.75
65.6	87.0	10.82	79.0	95.4	10.66	10.1	16.3	6.79
68.7	90.1	10.80	80.0	96.4	10.70	10.0	16.4	6.82

REV. X2

HJK-ED10960/1

101012

Page 2 of 5



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Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+11	+14	+17	+11	+14	+17
22.1	68.91	69.86	72.18	62.17	62.39	62.64
24.1	67.47	69.38	70.69	61.73	61.92	62.15
26.1	66.79	68.23	70.67	61.30	61.51	61.70
28.1	66.22	68.18	69.94	60.92	61.04	61.24
30.1	66.72	68.31	70.14	60.57	60.72	60.91
32.1	65.65	67.38	69.67	60.16	60.33	60.48
34.1	66.10	67.62	69.24	59.88	59.97	60.11
36.1	65.46	66.95	69.05	59.60	59.67	59.75
38.1	65.41	66.90	69.25	59.40	59.47	59.53
40.1	65.39	66.80	68.80	59.22	59.26	59.32
42.1	64.85	66.83	68.86	58.95	59.02	59.09
44.1	64.49	66.76	68.87	58.76	58.85	58.95
46.1	64.64	66.69	68.84	58.50	58.58	58.69
48.1	64.37	66.64	68.39	58.25	58.32	58.41
50.1	64.29	66.29	68.27	58.09	58.06	58.15
52.1	64.16	65.91	67.73	57.85	57.79	57.79
54.1	63.99	65.52	67.30	57.65	57.53	57.46
56.1	64.07	65.76	67.61	57.50	57.33	57.14
58.1	64.26	65.58	67.50	57.32	57.19	56.96
60.1	64.18	65.68	67.34	57.25	57.12	56.84
62.1	64.30	65.61	67.32	57.09	56.94	56.67
64.1	64.62	65.92	67.47	57.04	56.91	56.61
66.1	65.07	66.54	68.10	56.98	56.82	56.57
68.1	64.90	66.52	67.83	56.91	56.83	56.57
69.1	64.99	66.69	68.35	56.84	56.71	56.49
71.1	65.08	66.96	68.89	56.62	56.63	56.47
72.1	65.17	67.13	68.95	56.53	56.55	56.42
74.1	65.17	66.82	68.58	56.28	56.38	56.33
75.1	65.03	66.90	68.86	56.17	56.30	56.27
77.1	65.05	66.91	69.02	55.90	56.03	56.09
78.1	64.93	66.81	68.81	55.81	55.95	56.02
80.1	64.58	66.42	68.64	55.32	55.45	55.55
81.1	64.39	66.33	68.26	55.38	55.56	55.67
83.1	64.21	66.18	68.14	55.09	55.23	55.34
84.1	64.05	66.04	67.98	54.96	55.07	55.20
86.1	63.59	65.53	67.33	54.64	54.75	54.85
87.1	63.36	65.29	67.01	54.52	54.58	54.71
89.1	63.34	65.10	66.92	54.20	54.27	54.36
90.1	63.25	65.15	66.91	54.15	54.10	54.17

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+11	+14	+17
12.1	22.2	69.15	67.27	62.19
14.1	24.2	83.69	79.79	67.79
16.1	26.2	77.81	78.90	73.77
18.1	28.2	84.61	75.10	65.35
20.1	30.2	65.45	61.87	55.98
22.1	32.2	61.33	58.46	53.67
24.1	34.2	58.36	55.68	52.18
26.1	36.2	56.48	53.98	51.19
28.1	38.2	55.44	52.64	49.87
30.1	40.2	55.37	51.94	48.65
32.1	42.2	55.74	51.93	48.14
34.1	44.2	57.05	53.01	48.69
36.1	46.2	59.11	55.30	50.53
38.1	48.2	61.79	58.10	53.76
40.1	50.2	64.77	58.93	55.80
42.1	52.2	67.31	58.04	54.65
44.1	54.2	75.49	58.86	53.58
46.1	56.2	72.68	61.24	53.44
48.1	58.2	65.36	64.00	54.57
50.1	60.2	59.86	62.94	57.08
52.1	62.2	56.87	58.30	58.59
54.1	64.2	54.71	55.25	57.13
56.1	66.2	52.93	52.48	53.08
58.1	68.2	51.70	50.56	49.79
59.1	69.2	51.23	49.67	48.73
61.1	71.2	50.36	48.48	47.15
62.1	72.2	49.91	47.93	46.59
64.1	74.2	49.63	47.51	45.85
65.1	75.2	49.60	47.34	45.65
67.1	77.2	49.65	47.30	45.39
68.1	78.2	49.70	47.31	45.36
70.1	80.2	49.92	47.41	45.30
71.1	81.2	50.00	47.48	45.43
73.1	83.2	50.23	47.67	45.73
74.1	84.2	50.44	47.96	46.07
76.1	86.2	50.89	48.70	46.91
77.1	87.2	51.20	49.28	47.53
79.1	89.2	52.00	50.46	48.63
80.1	90.2	52.38	50.93	48.96

Frequency Mixer

HJK-ED10960/1

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)			IF (OUT) (MHz)	IF VSWR @LO=28.9MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+11	+14	+17		+11	+14	+17		+11	+14	+17
12.1	22.2	1.18	1.26	1.34	22.1	3.24	3.24	3.22	10.0	1.75	1.65	1.57
14.1	24.2	1.28	1.37	1.46	24.1	3.22	3.22	3.21	10.5	1.78	1.68	1.60
16.1	26.2	1.44	1.55	1.66	26.1	3.28	3.27	3.27	11.0	1.81	1.71	1.63
18.1	28.2	1.57	1.69	1.82	28.1	3.30	3.29	3.29	11.5	1.84	1.75	1.67
20.1	30.2	1.65	1.78	1.91	30.1	3.26	3.26	3.25	12.0	1.89	1.79	1.71
22.1	32.2	1.76	1.91	2.06	32.1	3.26	3.26	3.25	12.5	1.93	1.84	1.75
24.1	34.2	1.81	1.98	2.13	34.1	3.27	3.26	3.26	13.0	1.98	1.88	1.80
26.1	36.2	1.91	2.08	2.24	36.1	3.27	3.26	3.26	13.5	2.03	1.93	1.85
28.1	38.2	2.07	2.26	2.44	38.1	3.25	3.25	3.25	14.0	2.07	1.97	1.89
30.1	40.2	2.21	2.42	2.61	40.1	3.24	3.25	3.24	14.5	2.11	2.02	1.93
32.1	42.2	2.36	2.59	2.80	42.1	3.24	3.24	3.24	15.0	2.15	2.06	1.98
34.1	44.2	2.51	2.75	2.98	44.1	3.24	3.25	3.24	15.5	2.20	2.11	2.03
36.1	46.2	2.67	2.93	3.17	46.1	3.26	3.25	3.25	16.0	2.25	2.16	2.07
38.1	48.2	2.83	3.10	3.35	48.1	3.26	3.26	3.26	16.5	2.31	2.21	2.13
40.1	50.2	2.98	3.27	3.54	50.1	3.27	3.27	3.26	17.0	2.36	2.26	2.18
42.1	52.2	3.15	3.45	3.71	52.1	3.28	3.29	3.27	17.5	2.39	2.30	2.21
44.1	54.2	3.35	3.66	3.94	54.1	3.30	3.30	3.29	18.0	2.43	2.33	2.25
46.1	56.2	3.50	3.82	4.08	56.1	3.25	3.25	3.25	18.5	2.48	2.38	2.30
48.1	58.2	3.70	4.01	4.29	58.1	3.22	3.22	3.22	19.0	2.52	2.42	2.34
50.1	60.2	3.22	3.46	3.65	60.1	3.19	3.20	3.19	19.5	2.56	2.46	2.38
52.1	62.2	3.48	3.74	3.95	62.1	3.19	3.20	3.19	20.0	2.60	2.51	2.42
54.1	64.2	3.61	3.90	4.12	64.1	3.19	3.19	3.19	20.5	2.66	2.56	2.48
56.1	66.2	3.91	4.23	4.48	66.1	3.21	3.21	3.21	21.0	2.71	2.61	2.53
58.1	68.2	4.33	4.68	4.99	68.1	3.19	3.20	3.20	21.5	2.76	2.66	2.57
59.1	69.2	4.57	4.96	5.30	69.1	3.24	3.24	3.24	22.0	2.80	2.71	2.62
61.1	71.2	4.69	5.12	5.46	71.1	3.27	3.27	3.27	22.5	2.84	2.74	2.66
62.1	72.2	4.74	5.14	5.51	72.1	3.28	3.29	3.29	23.0	2.88	2.78	2.69
64.1	74.2	4.93	5.34	5.72	74.1	3.37	3.38	3.38	23.5	2.92	2.82	2.73
65.1	75.2	5.14	5.58	5.97	75.1	3.36	3.37	3.37	24.0	2.97	2.87	2.78
67.1	77.2	5.39	5.83	6.26	77.1	3.42	3.42	3.42	24.5	3.02	2.92	2.82
68.1	78.2	5.59	6.03	6.49	78.1	3.45	3.46	3.46	25.0	3.07	2.96	2.87
70.1	80.2	5.74	6.19	6.63	80.1	3.49	3.50	3.50	25.5	3.14	3.02	2.93
71.1	81.2	5.72	6.17	6.58	81.1	3.48	3.49	3.49	26.0	3.22	3.12	3.02
73.1	83.2	6.07	6.51	6.97	83.1	3.54	3.55	3.55	26.5	3.32	3.22	3.13
74.1	84.2	6.13	6.58	7.00	84.1	3.54	3.56	3.56	27.0	3.48	3.38	3.30
76.1	86.2	6.56	7.02	7.50	86.1	3.57	3.58	3.58				
77.1	87.2	6.53	6.97	7.41	87.1	3.58	3.59	3.60				
79.1	89.2	6.86	7.31	7.73	89.1	3.62	3.64	3.64				
80.1	90.2	6.97	7.41	7.80	90.1	3.65	3.66	3.67				

REV. X2

HJK-ED10960/1

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Page 4 of 5



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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	39	50	62	61	66	67	72	80	>83	>83
1	-	46	+0	48	15	55	21	63	26	50	39	57
2	66	78	76	66	79	76	81	80	82	83	>83	>83
3	>90	>83	62	81	67	>83	60	>83	58	>83	59	>83
4	>90	>83	>83	>83	74	>83	>83	>83	>83	>83	>83	>83
5	>90	>83	>83	>83	79	>83	>83	>83	>83	>83	81	>83
6	>90	>83	>83	>83	>83	70	>83	>83	>83	>83	>83	>83
7	>90	>83	>83	>83	>83	82	47	>83	>83	>83	>83	>83
8	>90	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83
9	>90	>83	>83	>83	>83	>83	>83	73	>83	>83	>83	>83
10	>90	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83	>83
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions:

RF IN: 21.4 MHz; 0.00 dBm.
LO IN: 31.4 MHz; +14.00 dBm
IF OUT: 10 MHz; -6.93 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	48	58	63	66	64	72	68	80	81	90
1	-	46	+0	49	16	56	23	62	28	53	42	63
2	46	69	69	56	71	70	73	74	74	80	82	>93
3	74	77	56	85	52	74	47	76	47	77	52	73
4	>90	>93	>93	>93	92	91	>93	90	>93	91	>93	>93
5	>90	>93	69	91	69	91	69	87	63	88	60	89
6	>90	>93	>93	>93	>93	81	>93	>93	>93	>93	>93	>93
7	>90	>93	78	>93	>93	>93	55	92	73	>93	74	>93
8	>90	>93	>93	>93	>93	>93	>93	>93	>93	>93	>93	>93
9	>90	>93	80	>93	88	>93	80	77	77	>93	81	>93
10	>90	>93	>93	>93	>93	>93	>93	>93	83	>93	>93	>93
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions:

RF IN: 21.4 MHz; 10.00 dBm.
LO IN: 31.4 MHz; +14.00 dBm
IF OUT: 10 MHz; 3.06 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.