

Frequency Mixer

HJK-ED14451/3

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB)			RF (IN) (MHz)	LO (MHz)	IP-3 INPUT (dBm)			RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+20dBm (dB)		
		@LO (dBm)					@LO (dBm)					@LO (dBm)		
+14	+17	+20	+14	+17	+20	+14	+17	+20						
40.1	10.1	7.12	6.88	6.70	40.1	10.1	35.94	36.49	36.96	40.1	10.1	0.20	0.21	0.22
52.1	22.1	7.34	7.05	6.83	52.1	22.1	35.60	36.60	37.54	52.1	22.1	0.29	0.38	0.46
64.1	34.1	7.47	7.19	7.10	64.1	34.1	34.42	36.40	37.17	64.1	34.1	0.20	0.17	0.03
79.1	49.1	7.63	7.41	7.29	79.1	49.1	37.89	40.96	35.74	79.1	49.1	0.17	0.13	0.07
91.1	61.1	7.56	7.38	7.28	91.1	61.1	39.30	36.67	33.31	91.1	61.1	0.29	0.20	0.07
106.1	76.1	7.53	7.33	7.16	106.1	76.1	36.10	32.64	31.68	106.1	76.1	0.20	0.08	0.11
118.1	88.1	7.47	7.22	7.12	118.1	88.1	34.32	31.48	30.45	118.1	88.1	0.25	0.22	0.04
130.1	100.1	7.56	7.30	7.09	130.1	100.1	33.38	30.56	29.86	130.1	100.1	0.21	0.06	0.04
145.1	115.1	7.60	7.32	7.07	145.1	115.1	30.79	29.15	29.17	145.1	115.1	0.25	0.06	0.08
157.1	127.1	7.66	7.41	7.19	157.1	127.1	29.76	28.73	29.13	157.1	127.1	0.29	0.07	-0.03
172.1	142.1	7.83	7.55	7.34	172.1	142.1	29.06	28.43	29.26	172.1	142.1	0.17	0.04	0.05
184.1	154.1	7.89	7.64	7.36	184.1	154.1	28.32	27.85	28.91	184.1	154.1	0.28	0.05	0.01
196.1	166.1	7.91	7.59	7.38	196.1	166.1	27.52	27.34	28.37	196.1	166.1	0.34	0.10	0.04
211.1	181.1	8.03	7.69	7.40	211.1	181.1	26.50	26.37	27.42	211.1	181.1	0.50	0.10	0.03
223.1	193.1	8.14	7.78	7.44	223.1	193.1	26.27	26.13	27.14	223.1	193.1	0.45	0.10	0.00
238.1	208.1	8.12	7.73	7.43	238.1	208.1	25.99	26.15	27.56	238.1	208.1	0.67	0.15	0.05
250.1	220.1	8.21	7.79	7.46	250.1	220.1	25.54	25.80	27.35	250.1	220.1	0.74	0.17	0.02
262.1	232.1	8.39	8.00	7.66	262.1	232.1	25.34	25.39	26.65	262.1	232.1	0.76	0.13	-0.05
277.1	247.1	8.59	8.17	7.78	277.1	247.1	25.12	25.14	26.19	277.1	247.1	1.18	0.22	0.07
289.1	259.1	8.71	8.22	7.86	289.1	259.1	25.02	25.29	26.25	289.1	259.1	1.62	0.51	0.06
304.1	274.1	8.97	8.47	8.06	304.1	274.1	24.75	25.33	26.35	304.1	274.1	2.05	0.68	0.06
316.1	286.1	9.13	8.58	8.16	316.1	286.1	24.58	25.23	26.46	316.1	286.1	2.31	0.88	0.13
331.1	301.1	9.27	8.73	8.24	331.1	301.1	23.65	24.48	25.97	331.1	301.1	2.60	1.08	0.11
343.1	313.1	9.43	8.84	8.42	343.1	313.1	22.91	23.79	25.15	343.1	313.1	2.70	1.19	0.12
355.1	325.1	9.72	9.14	8.68	355.1	325.1	22.03	22.61	23.54	355.1	325.1	2.88	1.29	0.08
370.1	340.1	9.87	9.22	8.74	370.1	340.1	20.77	21.17	21.94	370.1	340.1	3.33	1.76	0.41
382.1	352.1	10.05	9.31	8.75	382.1	352.1	20.17	20.69	21.63	382.1	352.1	3.57	2.01	0.65
397.1	367.1	10.27	9.43	8.79	397.1	367.1	19.66	20.17	21.36	397.1	367.1	3.80	2.29	0.94
409.1	379.1	10.32	9.37	8.67	409.1	379.1	19.50	19.86	21.19	409.1	379.1	4.05	2.59	1.23
421.1	391.1	10.36	9.36	8.61	421.1	391.1	19.16	19.50	20.77	421.1	391.1	4.24	2.86	1.48
436.1	406.1	10.68	9.65	8.82	436.1	406.1	18.86	19.05	20.05	436.1	406.1	4.22	2.91	1.62
448.1	418.1	10.88	9.85	9.04	448.1	418.1	19.05	19.10	19.93	448.1	418.1	4.44	3.02	1.67
463.1	433.1	11.16	10.11	9.21	463.1	433.1	19.01	19.02	19.88	463.1	433.1	4.76	3.27	1.95
475.1	445.1	11.43	10.33	9.44	475.1	445.1	19.00	19.05	19.84	475.1	445.1	4.82	3.52	2.19
487.1	457.1	11.73	10.66	9.71	487.1	457.1	19.36	19.32	20.09	487.1	457.1	4.75	3.23	1.98
502.1	472.1	11.94	10.90	9.90	502.1	472.1	20.08	20.10	21.15	502.1	472.1	4.67	3.08	1.78
514.1	484.1	12.09	11.00	10.01	514.1	484.1	20.62	21.09	22.66	514.1	484.1	4.30	2.80	1.45
529.1	499.1	12.30	11.29	10.29	529.1	499.1	22.41	22.98	26.07	529.1	499.1	3.93	2.31	1.07
541.1	511.1	12.57	11.43	10.55	541.1	511.1	23.68	23.67	26.91	541.1	511.1	3.64	2.10	0.75
556.1	526.1	12.87	11.88	11.16	556.1	526.1	22.44	21.34	21.03	556.1	526.1	3.37	1.76	0.30

Frequency Mixer

HJK-ED14451/3

Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=158.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=145.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=170MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+17			+17			+17
148.0	10.1	7.30	11.0	156.1	7.81	159.9	10.1	7.36
142.0	16.1	7.37	16.0	161.1	7.66	157.9	12.1	7.39
134.0	24.1	7.44	26.0	171.1	7.81	153.9	16.1	7.40
128.0	30.1	7.45	36.0	181.1	7.89	149.9	20.1	7.47
120.0	38.1	7.53	46.0	191.1	7.92	145.9	24.1	7.55
114.0	44.1	7.53	56.0	201.1	7.89	141.9	28.1	7.54
106.0	52.1	7.44	66.0	211.1	7.94	137.9	32.1	7.56
100.0	58.1	7.43	76.0	221.1	8.02	133.9	36.1	7.58
92.0	66.1	7.49	86.0	231.1	8.02	129.9	40.1	7.57
86.0	72.1	7.53	96.0	241.1	8.11	125.9	44.1	7.57
78.0	80.1	7.39	101.0	246.1	8.18	121.9	48.1	7.60
72.0	86.1	7.50	111.0	256.1	8.24	117.9	52.1	7.56
64.0	94.1	7.63	121.0	266.1	8.31	113.9	56.1	7.58
56.0	102.1	7.57	131.0	276.1	8.38	109.9	60.1	7.53
50.0	108.1	7.69	141.0	286.1	8.47	107.9	62.1	7.50
42.0	116.1	7.70	151.0	296.1	8.61	103.9	66.1	7.53
36.0	122.1	7.70	161.0	306.1	8.65	99.9	70.1	7.58
28.0	130.1	7.71	171.0	316.1	8.80	95.9	74.1	7.60
22.0	136.1	7.76	181.0	326.1	8.78	91.9	78.1	7.63
14.0	144.1	7.75	191.0	336.1	8.93	87.9	82.1	7.60
10.0	168.1	7.85	196.0	341.1	8.90	83.9	86.1	7.51
26.0	184.1	8.04	206.0	351.1	8.92	79.9	90.1	7.57
42.0	200.1	8.04	216.0	361.1	9.04	75.9	94.1	7.65
58.0	216.1	8.01	226.0	371.1	9.01	71.9	98.1	7.67
78.0	236.1	8.15	236.0	381.1	9.09	67.9	102.1	7.73
94.0	252.1	8.36	246.0	391.1	9.04	63.9	106.1	7.69
110.0	268.1	8.48	256.0	401.1	9.15	59.9	110.1	7.72
130.0	288.1	8.51	266.0	411.1	9.28	57.9	112.1	7.78
146.0	304.1	8.64	276.0	421.1	9.35	53.9	116.1	7.76
162.0	320.1	8.95	286.0	431.1	9.45	49.9	120.1	7.80
182.0	340.1	9.04	291.0	436.1	9.49	45.9	124.1	7.82
198.0	356.1	9.04	301.0	446.1	9.67	41.9	128.1	7.75
214.0	372.1	9.19	311.0	456.1	9.82	37.9	132.1	7.73
234.0	392.1	9.18	321.0	466.1	9.92	33.9	136.1	7.82
250.0	408.1	9.26	331.0	476.1	10.08	29.9	140.1	7.81
266.0	424.1	9.46	341.0	486.1	10.22	25.9	144.1	7.79
282.0	440.1	9.59	351.0	496.1	10.45	21.9	148.1	7.79
302.0	460.1	9.88	361.0	506.1	10.70	17.9	152.1	7.78
318.0	476.1	10.09	371.0	516.1	11.03	13.9	156.1	7.79
334.0	492.1	10.40	381.0	526.1	11.21	9.9	160.1	7.88

Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+14	+17	+20	+14	+17	+20
10.1	65.26	70.69	70.48	64.78	64.80	65.59
22.1	78.35	68.59	67.00	58.59	58.66	59.49
34.1	63.61	65.95	64.31	54.91	55.09	55.47
49.1	61.54	61.31	61.76	51.33	51.61	51.96
61.1	58.68	59.30	59.99	48.98	49.26	49.96
76.1	57.13	57.36	58.13	47.06	47.31	47.95
88.1	55.92	56.36	56.32	46.19	46.45	46.77
100.1	55.22	55.40	55.98	45.45	45.64	45.89
115.1	54.55	54.78	55.10	44.49	44.71	44.95
130.1	52.95	53.38	53.74	43.29	43.51	43.71
142.1	52.16	52.59	52.88	42.45	42.66	42.86
154.1	51.75	52.07	52.37	42.01	42.20	42.39
166.1	51.59	51.90	52.35	41.91	42.06	42.24
181.1	51.85	52.28	52.73	42.00	42.14	42.32
193.1	52.11	52.51	53.06	41.87	42.02	42.18
208.1	51.84	52.38	52.79	41.59	41.75	41.92
220.1	51.34	51.64	52.04	41.32	41.46	41.60
232.1	51.30	51.53	51.91	41.22	41.33	41.47
247.1	51.41	51.73	52.10	41.47	41.57	41.69
259.1	51.37	51.64	51.93	41.74	41.82	41.93
274.1	51.39	51.54	51.70	41.97	42.02	42.12
286.1	51.57	51.71	51.82	42.04	42.07	42.11
301.1	51.99	52.08	52.20	42.05	42.07	42.08
313.1	52.48	52.40	52.44	42.11	42.12	42.13
325.1	53.67	53.77	53.71	42.31	42.30	42.30
340.1	56.32	56.95	57.89	42.73	42.77	42.80
352.1	59.66	61.15	63.48	43.20	43.25	43.29
367.1	66.45	71.38	80.06	43.63	43.72	43.83
379.1	84.79	70.93	63.29	43.81	43.95	44.11
391.1	68.53	62.63	58.82	44.05	44.23	44.45
406.1	66.22	62.06	59.03	44.32	44.48	44.69
418.1	63.28	59.97	57.50	44.67	44.93	45.21
433.1	61.38	58.30	55.81	44.99	45.43	45.87
445.1	60.66	57.60	55.38	45.20	45.78	46.34
457.1	59.74	56.56	54.32	45.36	46.12	46.97
472.1	57.96	54.98	52.60	45.40	46.52	47.89
484.1	56.84	53.77	51.57	45.57	47.17	49.18
499.1	56.09	52.96	50.94	45.64	47.70	50.18
511.1	54.84	52.05	50.35	46.06	48.54	51.66
526.1	53.10	50.85	49.71	46.22	48.97	52.42

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+14	+17	+20
40.1	10.1	46.37	50.61	49.23
52.1	22.1	44.59	47.02	47.82
64.1	34.1	44.05	46.69	47.43
79.1	49.1	45.93	49.95	49.41
91.1	61.1	43.12	44.72	45.85
106.1	76.1	42.83	44.89	45.65
118.1	88.1	45.04	48.33	50.95
130.1	100.1	43.03	45.18	47.48
145.1	115.1	42.00	43.54	44.52
157.1	127.1	42.67	45.28	47.58
172.1	142.1	41.97	44.07	45.64
184.1	154.1	40.68	42.11	42.89
196.1	166.1	40.13	41.32	42.35
211.1	181.1	39.41	40.70	41.72
223.1	193.1	39.07	40.19	41.11
238.1	208.1	39.05	40.46	41.34
250.1	220.1	39.61	42.48	44.44
262.1	232.1	38.85	41.98	45.34
277.1	247.1	36.65	38.64	40.60
289.1	259.1	35.42	36.86	38.39
304.1	274.1	34.45	35.32	36.31
316.1	286.1	33.53	33.90	34.29
331.1	301.1	32.48	32.45	32.40
343.1	313.1	32.06	32.12	32.02
355.1	325.1	31.48	31.66	31.59
370.1	340.1	31.15	31.62	31.84
382.1	352.1	30.59	31.19	31.52
397.1	367.1	30.30	31.11	31.90
409.1	379.1	29.77	30.57	31.68
421.1	391.1	29.34	29.91	31.16
436.1	406.1	28.97	29.41	30.48
448.1	418.1	28.82	29.19	30.48
463.1	433.1	28.89	29.21	30.68
475.1	445.1	28.78	28.75	30.08
487.1	457.1	29.14	29.18	30.83
502.1	472.1	28.86	28.90	30.41
514.1	484.1	28.76	28.91	30.14
529.1	499.1	28.79	28.96	29.27
541.1	511.1	28.47	27.92	27.49
556.1	526.1	27.75	26.15	24.62

Frequency Mixer

HJK-ED14451/3

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)			IF (OUT) (MHz)	IF VSWR @LO=130MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+14	+17	+20		+14	+17	+20		+14	+17	+20
40.1	10.1	2.00	2.14	2.25	10.1	2.52	2.52	1.97	10.1	1.68	1.62	1.57
52.1	22.1	1.95	2.08	2.19	22.1	2.52	2.53	2.31	12.1	1.69	1.63	1.57
64.1	34.1	1.91	2.03	2.13	34.1	2.54	2.55	2.47	14.1	1.70	1.64	1.58
79.1	49.1	1.90	2.01	2.11	49.1	2.58	2.58	2.44	18.1	1.71	1.65	1.59
91.1	61.1	1.90	1.99	2.07	61.1	2.63	2.64	2.20	20.1	1.71	1.65	1.59
106.1	76.1	1.85	1.94	2.01	76.1	2.69	2.70	2.33	24.1	1.71	1.65	1.59
118.1	88.1	1.79	1.89	1.96	88.1	2.75	2.77	2.72	26.1	1.71	1.65	1.59
130.1	100.1	1.74	1.83	1.91	100.1	2.82	2.84	2.84	28.1	1.71	1.65	1.59
145.1	115.1	1.69	1.78	1.85	115.1	2.90	2.92	2.92	32.1	1.70	1.64	1.58
157.1	127.1	1.65	1.74	1.81	130.1	2.99	3.00	3.01	34.1	1.69	1.63	1.57
172.1	142.1	1.61	1.69	1.76	142.1	3.04	3.06	3.07	38.1	1.68	1.62	1.56
184.1	154.1	1.58	1.65	1.72	154.1	3.08	3.10	3.11	40.1	1.68	1.61	1.56
196.1	166.1	1.54	1.62	1.68	166.1	3.11	3.12	3.13	42.1	1.67	1.61	1.55
211.1	181.1	1.50	1.56	1.63	181.1	3.12	3.14	3.15	46.1	1.67	1.61	1.55
223.1	193.1	1.47	1.54	1.61	193.1	3.13	3.15	3.15	48.1	1.67	1.61	1.55
238.1	208.1	1.44	1.51	1.58	208.1	3.12	3.14	3.14	52.1	1.68	1.62	1.56
250.1	220.1	1.43	1.49	1.55	220.1	3.10	3.12	3.12	54.1	1.68	1.62	1.56
262.1	232.1	1.41	1.46	1.52	232.1	3.07	3.09	3.09	56.1	1.68	1.62	1.57
277.1	247.1	1.39	1.44	1.50	247.1	3.03	3.04	3.04	60.1	1.69	1.63	1.57
289.1	259.1	1.39	1.44	1.49	259.1	2.99	3.00	3.01	62.1	1.70	1.64	1.58
304.1	274.1	1.40	1.44	1.49	274.1	2.94	2.95	2.96	66.1	1.70	1.64	1.58
316.1	286.1	1.42	1.45	1.49	286.1	2.90	2.91	2.92	68.1	1.70	1.64	1.58
331.1	301.1	1.45	1.48	1.50	301.1	2.85	2.86	2.86	72.1	1.69	1.63	1.57
343.1	313.1	1.49	1.51	1.53	313.1	2.80	2.81	2.82	74.1	1.68	1.62	1.56
355.1	325.1	1.52	1.54	1.56	325.1	2.76	2.76	2.77	76.1	1.68	1.62	1.56
370.1	340.1	1.56	1.58	1.60	340.1	2.70	2.71	2.71	80.1	1.66	1.60	1.54
382.1	352.1	1.60	1.62	1.64	352.1	2.66	2.67	2.67	82.1	1.65	1.59	1.53
397.1	367.1	1.65	1.68	1.71	367.1	2.62	2.62	2.62	86.1	1.64	1.58	1.52
409.1	379.1	1.70	1.73	1.76	379.1	2.59	2.59	2.59	88.1	1.64	1.58	1.52
421.1	391.1	1.74	1.77	1.81	391.1	2.56	2.56	2.56	90.1	1.64	1.57	1.52
436.1	406.1	1.80	1.83	1.86	406.1	2.52	2.52	2.52	94.1	1.64	1.57	1.51
448.1	418.1	1.84	1.87	1.91	418.1	2.49	2.49	2.49	96.1	1.64	1.58	1.52
463.1	433.1	1.88	1.91	1.95	433.1	2.45	2.45	2.45	100.1	1.65	1.59	1.53
475.1	445.1	1.91	1.95	1.98	445.1	2.41	2.42	2.42	102.1	1.65	1.59	1.53
487.1	457.1	1.93	1.97	2.01	457.1	2.38	2.38	2.38	104.1	1.66	1.60	1.54
502.1	472.1	1.96	1.99	2.04	472.1	2.33	2.34	2.34	108.1	1.67	1.61	1.55
514.1	484.1	1.98	2.00	2.07	484.1	2.30	2.30	2.30	110.1	1.67	1.61	1.55
529.1	499.1	2.00	2.02	2.08	499.1	2.25	2.26	2.26	114.1	1.67	1.61	1.55
541.1	511.1	2.04	2.04	2.09	511.1	2.21	2.22	2.22	116.1	1.67	1.60	1.54
556.1	526.1	2.09	2.09	2.12	526.1	2.16	2.16	2.16	120.1	1.65	1.59	1.53



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IF/RF MICROWAVE COMPONENTS

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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	---	---	23.89	40.05	41.14	46.39	42.33	47.28	61.47	50.43	49.21	52.63
1	---	41.40	---	72.04	10.66	54.97	24.66	50.80	28.48	60.14	39.80	62.63
2	100.94	51.79	57.22	57.96	64.32	60.64	56.20	57.24	58.90	58.60	57.40	60.53
3	108.12	85.51	42.56	83.94	51.74	85.18	48.44	79.11	43.21	77.27	49.49	77.28
4	118.42	77.87	72.60	75.26	78.98	80.78	79.96	79.43	77.28	73.63	85.54	78.02
5	117.83	93.88	60.81	90.84	73.57	95.88	62.81	97.06	65.22	97.39	70.55	89.73
6	120.33	83.74	86.22	85.28	92.08	82.72	83.29	87.20	87.37	91.15	88.50	85.67
7	118.38	100.54	73.21	101.72	66.61	104.51	72.66	97.80	68.37	102.80	71.11	106.82
8	117.59	98.39	95.33	94.81	89.47	96.31	90.73	94.34	86.53	90.70	90.91	96.34
9	116.70	106.35	82.73	107.95	80.16	106.99	77.45	117.66	77.74	110.67	83.20	117.02
10	117.02	106.25	105.64	108.51	104.71	111.28	100.74	109.25	102.93	108.84	95.78	104.29
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions: RF IN: 158 MHz; 5 dBm.
 LO IN: 128 MHz; +17.00 dBm
 IF OUT: 30 MHz; -2.86 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	---	---	32.97	46.64	55.82	45.63	44.66	60.83	55.91	50.99	57.01	47.89
1	---	42.23	---	70.34	10.37	58.20	22.96	58.01	23.44	68.42	28.58	68.78
2	90.68	44.72	43.99	53.59	58.02	60.99	55.10	56.48	59.61	64.95	62.46	65.42
3	97.62	64.10	34.63	80.56	54.28	75.50	81.22	71.59	34.50	69.39	53.97	70.12
4	110.88	71.27	58.81	63.83	69.05	67.77	68.54	66.84	64.78	65.96	64.57	66.95
5	109.65	76.91	57.41	76.09	44.93	81.74	51.67	85.19	50.64	86.88	47.31	79.59
6	107.47	72.12	72.00	71.83	69.79	71.39	74.66	78.96	72.68	79.64	76.21	75.86
7	107.19	90.58	63.13	83.48	62.13	82.66	56.77	81.36	60.44	84.74	60.64	82.89
8	108.65	86.44	78.71	79.09	80.30	79.07	83.42	80.19	75.96	81.54	82.75	85.30
9	106.15	107.11	82.19	107.88	70.09	96.66	70.17	103.21	69.57	93.77	69.43	100.57
10	107.79	92.28	92.37	96.09	90.25	86.39	88.05	87.61	92.47	88.60	82.12	87.21
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions: RF IN: 158 MHz; 15 dBm.
 LO IN: 128 MHz; +17.00 dBm
 IF OUT: 30 MHz; 7.63 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.