

Frequency Mixer

TAK-1WH+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB)		
		@LO (dBm)		
		+14	+17	+20
5.0	35.0	6.44	5.75	5.40
10.0	40.0	6.71	5.93	5.59
30.4	60.4	7.01	6.23	6.08
50.8	80.8	7.06	6.27	6.14
71.2	101.2	6.96	6.20	6.10
91.6	121.6	7.06	6.23	6.10
112.0	142.0	6.95	6.14	6.10
132.4	162.4	6.82	6.12	6.10
152.8	182.8	6.89	6.15	6.11
173.2	203.2	6.78	6.13	6.12
193.5	223.5	6.68	6.08	6.11
213.9	243.9	6.68	6.10	6.10
234.3	264.3	6.66	6.11	6.13
254.7	284.7	6.65	6.12	6.14
275.1	305.1	6.69	6.16	6.18
295.5	325.5	6.69	6.16	6.20
315.9	345.9	6.77	6.25	6.25
336.3	366.3	6.83	6.34	6.31
356.7	386.7	6.89	6.39	6.37
377.1	407.1	6.91	6.46	6.49
397.5	427.5	6.97	6.50	6.52
417.9	447.9	6.97	6.50	6.52
438.3	468.3	6.97	6.50	6.52
458.7	488.7	6.97	6.50	6.52
479.1	509.1	6.97	6.50	6.52
499.5	529.5	6.97	6.50	6.52
519.9	549.9	6.97	6.50	6.52
540.3	570.3	6.97	6.50	6.52
560.7	590.7	6.97	6.50	6.52
581.1	611.1	6.97	6.50	6.52
601.5	631.5	6.97	6.50	6.52
621.9	651.9	6.97	6.50	6.52
642.3	672.3	6.97	6.50	6.52
662.7	692.7	6.97	6.50	6.52
683.1	713.1	6.97	6.50	6.52
703.5	733.5	6.97	6.50	6.52
723.9	753.9	6.97	6.50	6.52
744.3	774.3	6.97	6.50	6.52
764.7	794.7	6.97	6.50	6.52
785.1	815.1	6.97	6.50	6.52
805.5	835.5	6.97	6.50	6.52
825.9	855.9	6.97	6.50	6.52
846.3	876.3	6.97	6.50	6.52
866.7	896.7	6.97	6.50	6.52
887.1	917.1	6.97	6.50	6.52
907.5	937.5	6.97	6.50	6.52
927.9	957.9	6.97	6.50	6.52
948.3	978.3	6.97	6.50	6.52
968.7	998.7	6.97	6.50	6.52
989.1	1019.1	6.97	6.50	6.52
1009.5	1039.5	6.97	6.50	6.52
1029.9	1059.9	6.97	6.50	6.52
1050.3	1080.3	6.97	6.50	6.52

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)		
		@LO (dBm)		
		+14	+17	+20
10.0	40.0	25.74	31.37	30.94
30.4	60.4	24.59	28.71	27.86
50.8	80.8	26.67	27.68	26.69
71.2	101.2	28.19	26.30	27.50
91.6	121.6	23.59	24.55	30.46
112.0	142.0	24.14	27.10	33.88
132.4	162.4	24.77	28.01	31.95
152.8	182.8	23.30	27.39	30.97
173.2	203.2	23.69	38.32	28.24
193.5	223.5	24.41	31.23	29.12
213.9	243.9	25.59	30.47	30.47
234.3	264.3	28.16	27.22	28.65
254.7	284.7	26.83	25.27	26.89
275.1	305.1	36.45	24.29	25.68
295.5	325.5	25.91	23.93	24.77
315.9	345.9	26.93	25.17	24.56
336.3	366.3	27.91	28.59	28.53
356.7	386.7	26.21	26.29	25.76
377.1	407.1	24.55	24.98	23.66
397.5	427.5	22.33	24.07	24.07
417.9	447.9	19.60	24.55	28.80
438.3	468.3	18.91	22.88	28.94
458.7	488.7	17.71	19.33	23.63
479.1	509.1	17.12	18.59	21.51
499.5	529.5	16.74	18.58	20.08
519.9	549.9	16.44	18.78	20.28
540.3	570.3	16.87	20.10	23.32
560.7	590.7	18.25	22.23	28.23
581.1	611.1	18.83	25.20	24.12
601.5	631.5	18.05	23.79	22.54
621.9	651.9	17.11	23.53	21.94
642.3	672.3	16.67	24.14	22.63
662.7	692.7	15.95	20.35	22.86
683.1	713.1	16.18	19.33	22.37
703.5	733.5	16.48	17.14	18.75
723.9	753.9	17.16	16.84	17.91
744.3	774.3	19.22	17.83	17.52
764.7	794.7	20.59	19.00	18.09
785.1	815.1	23.37	21.52	20.70
805.5	835.5	23.83	22.77	22.18

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+14dBm (dB)		
		@LO (dBm)		
		+14	+17	+20
10.0	40.0	0.66	0.28	0.16
30.4	60.4	0.68	0.39	0.24
50.8	80.8	0.74	0.45	0.24
71.2	101.2	0.85	0.38	0.23
91.6	121.6	0.72	0.39	0.23
112.0	142.0	0.69	0.37	0.20
132.4	162.4	0.75	0.39	0.21
152.8	182.8	0.85	0.39	0.22
173.2	203.2	0.79	0.37	0.20
193.5	223.5	0.92	0.38	0.21
213.9	243.9	0.92	0.40	0.23
234.3	264.3	0.99	0.43	0.24
254.7	284.7	0.97	0.41	0.25
275.1	305.1	0.92	0.39	0.28
295.5	325.5	0.94	0.41	0.30
315.9	345.9	0.91	0.37	0.27
336.3	366.3	1.00	0.46	0.38
356.7	386.7	1.03	0.47	0.38
377.1	407.1	1.22	0.66	0.50
397.5	427.5	1.36	0.79	0.60
417.9	447.9	1.51	0.98	0.73
438.3	468.3	1.45	0.92	0.70
458.7	488.7	1.72	1.15	0.93
479.1	509.1	1.82	1.23	1.01
499.5	529.5	1.93	1.37	1.17
519.9	549.9	2.00	1.48	1.25
540.3	570.3	1.94	1.52	1.27
560.7	590.7	1.95	1.56	1.26
581.1	611.1	1.76	1.65	1.29
601.5	631.5	1.61	1.63	1.29
621.9	651.9	1.35	1.56	1.31
642.3	672.3	1.21	1.53	1.35
662.7	692.7	1.02	1.37	1.36
683.1	713.1	0.89	1.25	1.28
703.5	733.5	0.71	0.98	0.99
723.9	753.9	0.60	0.81	0.82
744.3	774.3	0.52	0.56	0.56
764.7	794.7	0.43	0.42	0.40
785.1	815.1	0.44	0.31	0.24
805.5	835.5	0.37	0.23	0.15

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Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=375.1MHz (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)=750.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+17			+17			+17
365.0	10.1	6.86	10.0	20.1	6.26	740.0	10.1	8.62
355.9	19.2	6.81	28.7	38.8	6.13	721.3	28.8	8.52
346.8	28.3	6.77	47.4	57.5	6.22	702.6	47.5	8.41
337.7	37.4	6.62	66.2	76.3	6.23	683.8	66.3	8.30
328.6	46.5	6.63	84.9	95.0	6.25	665.1	85.0	8.24
319.5	55.6	6.53	103.6	113.7	6.20	646.4	103.7	8.12
310.4	64.7	6.52	122.3	132.4	6.20	627.7	122.4	8.08
301.3	73.8	6.50	141.0	151.1	6.30	609.0	141.1	7.93
292.2	82.9	6.39	159.7	169.8	6.35	590.3	159.8	7.84
283.1	92.0	6.40	178.5	188.6	6.30	571.5	178.6	7.84
274.0	101.1	6.29	197.2	207.3	6.28	552.8	197.3	7.84
264.9	110.2	6.24	215.9	226.0	6.34	534.1	216.0	7.85
255.8	119.3	6.21	234.6	244.7	6.39	515.4	234.7	7.78
246.7	128.4	6.12	253.3	263.4	6.45	496.7	253.4	7.84
237.6	137.5	6.14	272.1	282.2	6.41	477.9	272.2	7.72
228.5	146.6	6.07	290.8	300.9	6.43	459.2	290.9	7.77
219.4	155.7	6.05	309.5	319.6	6.46	440.5	309.6	7.83
210.3	164.8	6.08	328.2	338.3	6.56	421.8	328.3	7.78
201.2	173.9	6.09	346.9	357.0	6.52	403.1	347.0	7.73
192.1	183.0	6.06	365.6	375.7	6.69	384.4	365.7	7.72
182.9	192.2	6.10	384.4	394.5	6.73	365.6	384.5	7.83
173.8	201.3	6.12	403.1	413.2	6.73	346.9	403.2	7.70
164.7	210.4	6.14	421.8	431.9	6.90	328.2	421.9	7.72
155.6	219.5	6.14	440.5	450.6	6.93	309.5	440.6	7.71
146.5	228.6	6.16	459.2	469.3	6.99	290.8	459.3	7.71
137.4	237.7	6.18	477.9	488.0	6.87	272.1	478.0	7.68
128.3	246.8	6.17	496.7	506.8	6.92	253.3	496.8	7.70
119.2	255.9	6.19	515.4	525.5	6.86	234.6	515.5	7.67
110.1	265.0	6.23	534.1	544.2	6.81	215.9	534.2	7.74
101.0	274.1	6.28	552.8	562.9	6.79	197.2	552.9	7.72
91.9	283.2	6.28	571.5	581.6	6.64	178.5	571.6	7.67
82.8	292.3	6.31	590.3	600.4	6.60	159.7	590.4	7.66
73.7	301.4	6.36	609.0	619.1	6.54	141.0	609.1	7.60
64.6	310.5	6.38	627.7	637.8	6.51	122.3	627.8	7.58
55.5	319.6	6.38	646.4	656.5	6.50	103.6	646.5	7.48
46.4	328.7	6.39	665.1	675.2	6.48	84.9	665.2	7.50
37.3	337.8	6.43	683.8	693.9	6.52	66.2	683.9	7.39
28.2	346.9	6.45	702.6	712.7	6.55	47.4	702.7	7.44
19.1	356.0	6.45	721.3	731.4	6.71	28.7	721.4	7.37
10.0	365.1	6.51	740.0	750.1	6.88	10.0	740.1	7.42

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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
5.0	63.21	63.53	63.16	62.44	62.84	61.66
10.0	60.61	59.56	58.73	58.61	57.61	56.43
30.4	66.45	69.82	73.20	50.54	47.99	46.36
50.8	62.41	66.68	71.08	46.56	43.87	42.38
71.2	59.62	63.36	67.95	43.44	41.17	39.48
91.6	57.86	62.06	68.19	41.61	39.02	37.64
112.0	55.90	59.95	66.59	40.04	37.70	36.00
132.4	54.35	59.75	69.88	38.76	36.09	34.84
152.8	53.41	58.49	66.46	37.70	35.23	34.05
173.2	52.08	57.76	68.01	36.73	34.60	33.61
193.5	51.09	57.25	65.99	36.06	34.28	33.39
213.9	50.55	57.70	65.12	35.17	33.61	32.64
234.3	50.11	57.84	60.96	35.05	33.57	32.36
254.7	49.37	56.19	64.96	34.91	33.49	32.03
275.1	49.10	57.58	59.56	33.95	32.80	31.45
295.5	48.63	56.57	60.94	34.43	32.91	31.41
315.9	48.68	57.28	56.40	34.24	32.49	30.83
356.7	47.73	54.69	54.98	33.33	31.14	29.56
377.1	48.18	54.71	54.42	32.52	30.55	28.96
417.9	47.15	52.10	50.64	31.86	29.37	27.97
438.3	47.22	53.60	51.22	31.03	28.60	27.03
499.5	46.25	50.37	45.77	30.34	27.79	25.56
540.2	47.63	50.08	45.01	29.37	27.68	25.30
560.6	47.64	49.04	45.97	28.30	27.10	25.16
601.4	45.89	46.43	43.95	27.48	25.92	23.81
621.8	45.50	46.15	43.62	26.55	24.90	23.07
662.6	43.58	44.55	43.06	26.23	24.05	21.84
683.0	42.36	42.63	41.19	25.83	23.60	21.21
723.8	41.12	42.44	41.13	25.90	23.12	20.36
744.2	40.06	42.50	41.89	25.95	23.49	20.34
785.0	39.76	43.00	42.00	25.39	24.18	21.00
805.4	39.77	44.21	42.10	25.01	24.32	20.88
846.2	38.80	43.17	43.14	23.91	24.24	21.02
866.6	38.21	41.29	41.44	23.67	24.03	20.93
907.3	38.55	40.97	40.46	22.77	23.41	20.48
927.7	38.74	41.46	41.14	22.71	22.96	20.03
968.5	39.73	43.42	40.67	22.13	22.17	19.40
988.9	41.50	45.44	39.62	22.02	21.77	19.03
1029.7	44.18	43.92	37.17	21.70	20.78	18.05
1050.1	45.17	42.81	36.60	21.59	20.45	17.88

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+14	+17	+20
10.0	40.0	51.44	46.25	46.49
30.4	60.4	41.05	41.09	41.67
50.8	80.8	36.94	37.46	37.59
71.2	101.2	34.43	34.78	34.98
91.6	121.6	32.64	33.19	33.42
112.0	142.0	31.32	31.78	32.08
132.4	162.4	30.36	30.82	30.95
152.8	182.8	29.49	29.96	30.26
173.2	203.2	28.95	29.38	29.56
193.5	223.5	28.71	29.12	29.33
213.9	243.9	28.26	28.81	29.08
234.3	264.3	28.04	28.85	29.20
254.7	284.7	27.91	28.63	29.17
275.1	305.1	27.45	28.30	28.86
295.5	325.5	27.69	28.46	28.94
315.9	345.9	27.63	28.19	28.56
356.7	386.7	28.17	28.74	28.98
377.1	407.1	28.15	28.82	29.29
417.9	447.9	27.83	28.65	29.42
438.3	468.3	27.48	28.30	28.84
479.1	509.1	26.16	26.95	27.30
499.5	529.5	25.44	26.21	26.50
540.2	570.2	24.03	24.63	25.06
560.6	590.6	23.52	24.03	24.43
601.4	631.4	22.58	22.36	22.14
621.8	651.8	22.27	21.89	21.54
662.6	692.6	22.33	21.92	21.44
683.0	713.0	22.47	22.20	21.78
723.8	753.8	23.11	23.32	23.53
744.2	774.2	23.45	23.49	23.45
785.0	815.0	23.34	22.59	21.57
805.4	835.4	23.03	21.88	20.81
846.2	876.2	22.24	20.70	19.54
866.6	896.6	22.01	20.46	19.15
907.3	937.3	21.38	20.37	19.28
927.7	957.7	21.02	20.35	19.45
968.5	998.5	20.16	19.90	19.37
988.9	1018.9	19.50	19.36	19.00
1029.7	1059.7	18.29	18.18	18.00
1050.1	1080.1	17.67	17.54	17.45

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Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)		
		@LO (dBm)		
		+14	+17	+20
5.0	35.0	1.25	1.14	1.17
10.0	40.0	1.22	1.06	1.11
30.4	60.4	1.21	1.06	1.02
50.8	80.8	1.17	1.05	1.04
71.2	101.2	1.16	1.03	1.07
91.6	121.6	1.16	1.04	1.09
112.0	142.0	1.14	1.05	1.13
132.4	162.4	1.12	1.06	1.14
152.8	182.8	1.14	1.06	1.14
173.2	203.2	1.11	1.08	1.17
193.5	223.5	1.09	1.11	1.19
213.9	243.9	1.09	1.11	1.21
234.3	264.3	1.08	1.13	1.22
254.7	284.7	1.07	1.14	1.23
275.1	305.1	1.07	1.13	1.23
295.5	325.5	1.07	1.15	1.24
315.9	345.9	1.08	1.17	1.24
356.7	386.7	1.10	1.20	1.29
377.1	407.1	1.11	1.22	1.31
417.9	447.9	1.12	1.25	1.34
438.3	468.3	1.13	1.27	1.36
479.1	509.1	1.11	1.25	1.32
499.5	529.5	1.12	1.23	1.30
540.2	570.2	1.06	1.15	1.21
560.6	590.6	1.04	1.12	1.17
601.4	631.4	1.07	1.07	1.13
621.8	651.8	1.12	1.10	1.14
662.6	692.6	1.24	1.21	1.23
683.0	713.0	1.32	1.29	1.30
723.8	753.8	1.52	1.47	1.47
744.2	774.2	1.63	1.56	1.56
785.0	815.0	1.89	1.78	1.75
805.4	835.4	2.01	1.88	1.83
846.2	876.2	2.31	2.13	2.03
866.6	896.6	2.46	2.27	2.15
907.3	937.3	2.78	2.60	2.48
927.7	957.7	2.95	2.78	2.66
968.5	998.5	3.27	3.13	3.00
988.9	1018.9	3.40	3.27	3.16
1029.7	1059.7	3.67	3.55	3.45
1050.1	1080.1	3.77	3.66	3.57

LO (MHz)	LO VSWR (:1)		
	@LO (dBm)		
	+14	+17	+20
5.0	1.32	1.53	2.59
10.0	1.21	1.52	2.59
30.4	1.03	1.62	2.39
50.8	1.04	1.61	2.36
71.2	1.01	1.54	2.22
91.6	1.02	1.53	2.21
112.0	1.02	1.54	2.23
132.4	1.01	1.58	2.31
152.8	1.03	1.57	2.27
173.2	1.02	1.53	2.20
193.5	1.01	1.54	2.20
213.9	1.03	1.58	2.27
234.3	1.03	1.60	2.30
254.7	1.05	1.59	2.26
275.1	1.06	1.59	2.25
295.5	1.06	1.59	2.25
315.9	1.09	1.63	2.30
356.7	1.12	1.64	2.28
377.1	1.14	1.64	2.27
417.9	1.17	1.70	2.34
438.3	1.20	1.71	2.34
479.1	1.23	1.71	2.32
499.5	1.26	1.75	2.35
540.2	1.30	1.78	2.37
560.6	1.32	1.78	2.35
601.4	1.36	1.82	2.39
621.8	1.39	1.83	2.39
662.6	1.43	1.84	2.37
683.0	1.46	1.86	2.38
723.8	1.51	1.90	2.39
744.2	1.53	1.92	2.39
785.0	1.57	1.96	2.43
805.4	1.59	1.98	2.46
846.2	1.62	2.00	2.46
866.6	1.64	2.01	2.48
907.3	1.67	2.04	2.51
927.7	1.71	2.07	2.53
968.5	1.73	2.07	2.52
988.9	1.76	2.08	2.53
1029.7	1.82	2.11	2.54
1050.1	1.85	2.13	2.53

IF (OUT) (MHz)	IF VSWR @LO=750.1MHz (:1)		
	@LO (dBm)		
	+14	+17	+20
5.0	2.14	1.81	1.60
10.0	2.14	1.81	1.60
29.0	2.52	1.87	1.57
47.9	2.44	1.80	1.50
66.9	2.38	1.76	1.48
85.9	2.47	1.83	1.55
104.9	2.60	1.95	1.65
123.8	2.57	1.92	1.64
142.8	2.54	1.90	1.62
161.8	2.61	1.96	1.68
180.8	2.71	2.05	1.77
199.7	2.69	2.04	1.77
218.7	2.71	2.04	1.77
237.7	2.77	2.10	1.82
256.7	2.73	2.08	1.82
275.6	2.73	2.08	1.82
294.6	2.80	2.13	1.86
313.6	2.86	2.18	1.91
332.6	2.82	2.15	1.88
351.5	2.80	2.13	1.86
370.5	2.90	2.21	1.92
389.5	2.92	2.23	1.94
408.5	2.87	2.18	1.89
427.4	2.90	2.20	1.89
446.4	2.96	2.24	1.92
465.4	2.96	2.24	1.91
484.4	2.92	2.20	1.86
503.3	2.96	2.23	1.87
522.3	2.97	2.23	1.87
541.3	2.94	2.20	1.82
560.3	2.97	2.22	1.82
579.2	3.00	2.23	1.82
598.2	2.97	2.22	1.79
617.2	2.89	2.15	1.73
636.2	2.95	2.20	1.76
655.1	3.03	2.26	1.80
674.1	3.00	2.23	1.77
693.1	2.97	2.23	1.77
712.1	2.96	2.23	1.78
731.0	2.98	2.25	1.80
750.0	2.35	1.69	1.29

Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	5	36	10	34	17	52	31	42	32	50
1	-	23	+0	33	12	38	29	48	32	42	36	55
2	98	56	37	56	38	55	38	58	50	64	49	65
3	>100	70	61	72	62	67	58	72	68	82	60	73
4	>100	78	67	73	66	71	69	71	70	83	87	81
5	>100	>92	91	>92	>92	>92	84	88	84	88	92	>92
6	>100	>92	>92	>92	>92	>92	>92	89	>92	89	>92	>92
7	>100	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92
8	>100	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92
9	>100	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92
10	>100	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions:

RF IN: 370.1 MHz; -1.00 dBm.

LO IN: 400.01 MHz; +17.00 dBm

IF OUT: 29.91 MHz; -7.53 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	14	47	26	48	32	60	47	51	47	65
1	-	23	+0	32	13	39	29	49	38	49	46	67
2	86	60	33	69	34	57	34	53	43	66	50	63
3	>100	58	43	58	44	56	41	71	61	63	47	59
4	>100	70	49	66	47	68	49	67	48	67	60	69
5	>100	82	68	76	59	73	56	65	53	67	66	79
6	>100	80	70	74	59	68	59	67	60	67	63	79
7	>100	86	82	93	77	>102	78	97	75	86	73	92
8	>100	89	84	92	82	82	72	77	71	74	70	74
9	>100	>102	>102	101	89	>102	80	88	83	86	81	86
10	>100	>102	96	96	102	101	101	87	91	84	82	79
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions:

RF IN: 370.1 MHz; 9.00 dBm.

LO IN: 400.01 MHz; +17.00 dBm

IF OUT: 29.91 MHz; 2.38 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.

REV. X2

TAK-1WH+

100818

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