

# Frequency Mixer

# HJK-9MH+

## Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=70MHz (dB)		
		@LO (dBm)		
		+10	+13	+16
750.1	680.1	6.76	6.66	6.64
755.1	685.1	6.73	6.64	6.62
760.1	690.1	6.70	6.60	6.58
765.1	695.1	6.67	6.58	6.56
770.1	700.1	6.66	6.57	6.56
775.1	705.1	6.66	6.59	6.58
780.1	710.1	6.67	6.60	6.60
785.1	715.1	6.67	6.61	6.61
790.1	720.1	6.66	6.60	6.60
795.1	725.1	6.65	6.58	6.59
800.1	730.1	6.62	6.56	6.56
805.1	735.1	6.60	6.54	6.54
810.1	740.1	6.60	6.54	6.55
815.1	745.1	6.61	6.56	6.57
820.1	750.1	6.64	6.60	6.62
825.1	755.1	6.66	6.63	6.65
830.1	760.1	6.68	6.65	6.67
835.1	765.1	6.68	6.66	6.68
840.1	770.1	6.68	6.65	6.69
845.1	775.1	6.68	6.65	6.66
850.1	780.1	6.68	6.65	6.67
855.1	785.1	6.70	6.66	6.68
860.1	790.1	6.72	6.69	6.70
865.1	795.1	6.75	6.72	6.74
870.1	800.1	6.77	6.74	6.76
875.1	805.1	6.78	6.75	6.76
880.1	810.1	6.78	6.74	6.75
885.1	815.1	6.78	6.73	6.73
890.1	820.1	6.78	6.72	6.72
895.1	825.1	6.78	6.73	6.72
900.1	830.1	6.81	6.76	6.75
905.1	835.1	6.84	6.79	6.79
910.1	840.1	6.88	6.83	6.82
915.1	845.1	6.90	6.85	6.85
920.1	850.1	6.93	6.87	6.86
925.1	855.1	6.94	6.88	6.87
930.1	860.1	6.96	6.89	6.87
935.1	865.1	6.97	6.91	6.89
940.1	870.1	7.00	6.93	6.91
945.1	875.1	7.04	6.97	6.95

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)		
		@LO (dBm)		
		+10	+13	+16
750.1	680.1	23.62	26.54	28.50
755.1	685.1	23.97	26.87	28.89
760.1	690.1	24.30	27.15	29.16
765.1	695.1	24.58	27.36	29.36
770.1	700.1	24.91	27.55	29.51
775.1	705.1	25.10	27.77	29.78
780.1	710.1	25.25	27.95	30.05
785.1	715.1	25.36	28.23	30.37
790.1	720.1	25.48	28.43	30.70
795.1	725.1	25.68	28.74	31.01
800.1	730.1	25.89	28.93	31.25
805.1	735.1	26.16	29.08	31.62
810.1	740.1	26.32	29.35	31.88
815.1	745.1	26.44	29.58	32.29
820.1	750.1	26.49	29.81	32.78
825.1	755.1	26.42	30.06	32.98
830.1	760.1	26.37	29.96	33.45
835.1	765.1	26.35	30.23	33.62
840.1	770.1	26.25	30.07	34.00
845.1	775.1	26.26	29.92	34.02
850.1	780.1	26.08	29.80	34.06
855.1	785.1	25.96	29.62	33.76
860.1	790.1	25.82	29.18	33.77
865.1	795.1	25.58	28.94	33.40
870.1	800.1	25.37	28.48	32.82
875.1	805.1	25.16	28.15	32.19
880.1	810.1	25.10	27.83	31.40
885.1	815.1	25.06	27.61	31.03
890.1	820.1	25.01	27.54	30.77
895.1	825.1	24.94	27.14	30.15
900.1	830.1	24.78	26.89	29.59
905.1	835.1	24.55	26.53	29.05
910.1	840.1	24.37	26.21	28.55
915.1	845.1	24.21	25.98	28.04
920.1	850.1	24.18	25.87	27.81
925.1	855.1	24.24	25.82	27.55
930.1	860.1	24.33	25.86	27.53
935.1	865.1	24.41	25.94	27.50
940.1	870.1	24.48	26.02	27.51
945.1	875.1	24.57	26.09	27.63

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+16dBm (dB)		
		@LO (dBm)		
		+10	+13	+16
750.1	680.1	1.25	0.67	0.34
755.1	685.1	1.18	0.62	0.32
760.1	690.1	1.10	0.58	0.30
765.1	695.1	1.04	0.54	0.28
770.1	700.1	0.98	0.51	0.27
775.1	705.1	0.94	0.48	0.25
780.1	710.1	0.90	0.46	0.24
785.1	715.1	0.87	0.44	0.23
790.1	720.1	0.83	0.43	0.23
795.1	725.1	0.79	0.41	0.22
800.1	730.1	0.75	0.39	0.21
805.1	735.1	0.72	0.37	0.20
810.1	740.1	0.68	0.35	0.19
815.1	745.1	0.65	0.33	0.17
820.1	750.1	0.63	0.31	0.16
825.1	755.1	0.61	0.30	0.16
830.1	760.1	0.59	0.30	0.15
835.1	765.1	0.59	0.29	0.15
840.1	770.1	0.58	0.30	0.14
845.1	775.1	0.58	0.29	0.15
850.1	780.1	0.57	0.28	0.14
855.1	785.1	0.56	0.28	0.14
860.1	790.1	0.57	0.28	0.14
865.1	795.1	0.58	0.28	0.14
870.1	800.1	0.60	0.29	0.14
875.1	805.1	0.61	0.29	0.15
880.1	810.1	0.62	0.30	0.15
885.1	815.1	0.63	0.31	0.15
890.1	820.1	0.63	0.30	0.16
895.1	825.1	0.63	0.30	0.15
900.1	830.1	0.64	0.30	0.15
905.1	835.1	0.65	0.30	0.15
910.1	840.1	0.68	0.31	0.15
915.1	845.1	0.70	0.32	0.15
920.1	850.1	0.72	0.33	0.15
925.1	855.1	0.73	0.33	0.15
930.1	860.1	0.75	0.34	0.15
935.1	865.1	0.78	0.35	0.15
940.1	870.1	0.80	0.35	0.15
945.1	875.1	0.82	0.36	0.15

## Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=835.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=818.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=853.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+13			+13			+13
535.0	300.1	10.81	10.0	828.1	7.08	550.0	303.1	10.78
505.4	329.7	9.76	70.0	888.1	6.89	540.0	313.1	10.37
475.8	359.3	9.45	130.0	948.1	6.83	530.0	323.1	10.06
446.3	388.8	8.83	190.0	1008.1	6.91	520.0	333.1	9.83
416.7	418.4	7.67	250.0	1068.1	6.97	510.0	343.1	9.61
387.1	448.0	7.90	310.0	1128.1	7.22	500.0	353.1	9.53
357.5	477.6	7.95	370.0	1188.1	7.35	490.0	363.1	9.39
328.0	507.1	8.46	430.0	1248.1	7.71	480.0	373.1	9.31
298.4	536.7	7.72	490.0	1308.1	8.04	470.0	383.1	9.01
268.8	566.3	7.35	550.0	1368.1	8.35	460.0	393.1	8.85
239.2	595.9	7.11	610.0	1428.1	8.69	440.0	413.1	8.41
209.6	625.5	6.88	670.0	1488.1	8.89	430.0	423.1	7.98
180.1	655.0	6.80	730.0	1548.1	8.95	410.0	443.1	7.95
150.5	684.6	6.68	790.0	1608.1	9.23	400.0	453.1	7.90
120.9	714.2	6.63	850.0	1668.1	9.46	380.0	473.1	8.01
98.7	736.4	6.66	910.0	1728.1	9.41	370.0	483.1	8.23
69.2	765.9	6.67	970.0	1788.1	9.58	350.0	503.1	8.51
47.0	788.1	6.70	1030.0	1848.1	9.50	340.0	513.1	8.34
17.4	817.7	6.80	1090.0	1908.1	9.41	320.0	533.1	7.87
42.9	878.0	6.89	1150.0	1968.1	9.36	310.0	543.1	7.70
174.4	1009.5	6.90	1210.0	2028.1	9.23	290.0	563.1	7.46
273.1	1108.2	7.12	1270.0	2088.1	9.18	280.0	573.1	7.29
404.6	1239.7	7.53	1330.0	2148.1	9.09	260.0	593.1	7.08
503.3	1338.4	8.12	1390.0	2208.1	8.96	250.0	603.1	7.10
634.9	1470.0	8.75	1450.0	2268.1	8.97	230.0	623.1	6.96
733.5	1568.6	9.06	1510.0	2328.1	8.89	220.0	633.1	6.88
865.1	1700.2	9.55	1570.0	2388.1	8.83	200.0	653.1	6.74
963.7	1798.8	9.56	1630.0	2448.1	8.78	190.0	663.1	6.80
1095.3	1930.4	9.34	1690.0	2508.1	8.72	170.0	683.1	6.74
1193.9	2029.0	9.23	1750.0	2568.1	8.60	160.0	693.1	6.69
1325.5	2160.6	9.16	1810.0	2628.1	8.59	140.0	713.1	6.63
1424.2	2259.3	9.02	1870.0	2688.1	8.58	130.0	723.1	6.64
1555.7	2390.8	8.86	1930.0	2748.1	8.65	110.0	743.1	6.66
1654.4	2489.5	8.73	1990.0	2808.1	8.75	100.0	753.1	6.69
1785.9	2621.0	8.60	2070.0	2888.1	8.95	80.0	773.1	6.70
1884.6	2719.7	8.62	2130.0	2948.1	9.13	70.0	783.1	6.66
2016.1	2851.2	8.82	2210.0	3028.1	9.45	50.0	803.1	6.68
2114.8	2949.9	9.12	2270.0	3088.1	9.73	40.0	813.1	6.76
2246.3	3081.4	9.68	2350.0	3168.1	10.13	20.0	833.1	6.87
2345.0	3180.1	10.16	2410.0	3228.1	10.42	10.0	843.1	7.11

# Frequency Mixer

# HJK-9MH+

## Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)			RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)					@LO (dBm)		
	+10	+13	+16	+10	+13	+16			+10	+13	+16
680.1	36.56	36.86	37.09	37.85	38.34	38.70	750.1	680.1	34.82	34.18	33.68
685.1	36.10	36.39	36.60	37.37	37.85	38.19	755.1	685.1	34.47	33.81	33.31
690.1	35.75	36.02	36.21	36.79	37.25	37.59	760.1	690.1	34.33	33.62	33.08
695.1	35.53	35.80	36.01	36.21	36.63	36.98	765.1	695.1	34.26	33.53	32.95
700.1	35.39	35.61	35.85	35.69	36.12	36.45	770.1	700.1	34.03	33.38	32.86
705.1	35.20	35.46	35.69	35.27	35.69	36.01	775.1	705.1	33.77	33.18	32.70
710.1	34.89	35.14	35.40	34.78	35.21	35.53	780.1	710.1	33.71	33.13	32.64
715.1	34.53	34.77	35.01	34.31	34.71	35.02	785.1	715.1	33.85	33.26	32.75
720.1	34.04	34.25	34.49	33.87	34.26	34.58	790.1	720.1	33.68	33.12	32.62
725.1	33.63	33.84	34.05	33.54	33.91	34.23	795.1	725.1	33.35	32.83	32.33
730.1	33.29	33.49	33.69	33.14	33.54	33.85	800.1	730.1	33.18	32.68	32.20
735.1	33.05	33.26	33.48	32.70	33.09	33.41	805.1	735.1	33.25	32.71	32.20
740.1	32.92	33.14	33.37	32.32	32.71	33.03	810.1	740.1	33.18	32.62	32.16
745.1	32.88	33.13	33.36	32.01	32.41	32.71	815.1	745.1	32.74	32.22	31.78
750.1	32.81	33.06	33.27	31.76	32.14	32.42	820.1	750.1	32.44	31.94	31.51
755.1	32.60	32.86	33.08	31.43	31.83	32.11	825.1	755.1	32.53	32.06	31.64
760.1	32.28	32.55	32.76	31.09	31.50	31.77	830.1	760.1	32.62	32.17	31.75
765.1	31.91	32.14	32.36	30.85	31.24	31.54	835.1	765.1	32.26	31.80	31.42
770.1	31.65	31.86	32.08	30.69	31.06	31.38	840.1	770.1	31.83	31.36	31.00
775.1	31.49	31.71	31.93	30.49	30.87	31.18	845.1	775.1	31.73	31.27	30.92
780.1	31.44	31.69	31.89	30.25	30.65	30.96	850.1	780.1	31.77	31.30	30.96
785.1	31.47	31.72	31.96	30.12	30.50	30.83	855.1	785.1	31.55	31.12	30.77
790.1	31.54	31.85	32.09	30.04	30.44	30.76	860.1	790.1	31.10	30.71	30.39
795.1	31.61	31.92	32.20	29.96	30.37	30.70	865.1	795.1	30.93	30.51	30.21
800.1	31.57	31.89	32.19	29.81	30.23	30.58	870.1	800.1	31.02	30.55	30.26
805.1	31.46	31.78	32.09	29.72	30.13	30.48	875.1	805.1	30.93	30.46	30.18
810.1	31.34	31.68	31.97	29.71	30.14	30.49	880.1	810.1	30.60	30.13	29.86
815.1	31.34	31.67	31.98	29.69	30.13	30.49	885.1	815.1	30.33	29.82	29.52
820.1	31.43	31.80	32.12	29.62	30.07	30.44	890.1	820.1	30.25	29.71	29.41
825.1	31.57	31.98	32.33	29.53	29.98	30.34	895.1	825.1	30.02	29.47	29.17
830.1	31.74	32.17	32.54	29.51	29.98	30.35	900.1	830.1	29.61	29.09	28.78
835.1	31.91	32.35	32.75	29.54	30.02	30.40	905.1	835.1	29.34	28.82	28.54
840.1	32.00	32.46	32.88	29.49	29.99	30.37	910.1	840.1	29.33	28.80	28.48
845.1	31.91	32.41	32.81	29.39	29.92	30.30	915.1	845.1	29.35	28.81	28.48
850.1	31.75	32.23	32.59	29.38	29.89	30.27	920.1	850.1	29.07	28.55	28.23
855.1	31.53	31.99	32.33	29.39	29.94	30.33	925.1	855.1	28.75	28.21	27.88
860.1	31.46	31.90	32.23	29.39	29.95	30.34	930.1	860.1	28.68	28.09	27.74
865.1	31.38	31.84	32.20	29.34	29.92	30.34	935.1	865.1	28.67	28.07	27.69
870.1	31.40	31.83	32.19	29.38	29.95	30.39	940.1	870.1	28.37	27.79	27.42
875.1	31.37	31.80	32.15	29.48	30.08	30.52	945.1	875.1	28.02	27.42	27.08

# Frequency Mixer

# HJK-9MH+

## Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)			IF (OUT) (MHz)	IF VSWR @LO=778MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+10	+13	+16		+10	+13	+16		+10	+13	+16
750.1	680.1	1.39	1.44	1.49	680.1	5.38	5.27	5.22	10.0	1.19	1.29	1.37
755.1	685.1	1.39	1.43	1.48	685.1	5.07	4.96	4.92	30.0	1.19	1.29	1.37
760.1	690.1	1.38	1.43	1.48	690.1	4.77	4.67	4.62	50.0	1.19	1.29	1.38
765.1	695.1	1.38	1.42	1.46	695.1	4.50	4.40	4.36	70.0	1.19	1.27	1.35
770.1	700.1	1.37	1.42	1.46	700.1	4.22	4.12	4.08	90.0	1.22	1.31	1.39
775.1	705.1	1.37	1.41	1.45	705.1	3.96	3.87	3.82	110.0	1.26	1.32	1.38
780.1	710.1	1.37	1.41	1.46	710.1	3.70	3.62	3.58	130.0	1.29	1.36	1.43
785.1	715.1	1.36	1.40	1.45	715.1	3.47	3.38	3.34	150.0	1.28	1.32	1.37
790.1	720.1	1.36	1.40	1.45	720.1	3.24	3.16	3.12	170.0	1.34	1.39	1.45
795.1	725.1	1.35	1.39	1.43	725.1	3.03	2.95	2.91	190.0	1.33	1.36	1.40
800.1	730.1	1.35	1.39	1.43	730.1	2.83	2.76	2.72	210.0	1.44	1.46	1.51
805.1	735.1	1.34	1.38	1.42	735.1	2.64	2.57	2.54	230.0	1.41	1.42	1.45
810.1	740.1	1.34	1.38	1.42	740.1	2.47	2.40	2.37	250.0	1.49	1.51	1.53
815.1	745.1	1.34	1.38	1.42	745.1	2.30	2.25	2.21	270.0	1.47	1.47	1.48
820.1	750.1	1.34	1.38	1.42	750.1	2.16	2.10	2.07	290.0	1.58	1.58	1.58
825.1	755.1	1.34	1.37	1.41	755.1	2.02	1.97	1.94	310.0	1.57	1.56	1.56
830.1	760.1	1.34	1.37	1.41	760.1	1.90	1.86	1.83	330.0	1.68	1.65	1.65
835.1	765.1	1.33	1.36	1.40	765.1	1.80	1.76	1.73	350.0	1.63	1.61	1.60
840.1	770.1	1.33	1.36	1.40	770.1	1.71	1.67	1.65	370.0	1.73	1.69	1.68
845.1	775.1	1.32	1.35	1.38	775.1	1.63	1.61	1.58	390.0	1.75	1.71	1.69
850.1	780.1	1.31	1.34	1.37	780.1	1.58	1.56	1.54	410.0	1.86	1.81	1.79
855.1	785.1	1.30	1.33	1.36	785.1	1.54	1.53	1.52	430.0	1.83	1.78	1.76
860.1	790.1	1.30	1.32	1.35	790.1	1.53	1.52	1.51	450.0	1.92	1.85	1.80
865.1	795.1	1.29	1.31	1.34	795.1	1.53	1.53	1.53	470.0	1.96	1.90	1.86
870.1	800.1	1.29	1.31	1.34	800.1	1.56	1.56	1.57	490.0	2.01	1.93	1.88
875.1	805.1	1.28	1.29	1.32	805.1	1.60	1.61	1.62	510.0	2.08	2.00	1.95
880.1	810.1	1.28	1.29	1.32	810.1	1.65	1.67	1.68	530.0	2.06	1.97	1.91
885.1	815.1	1.27	1.28	1.30	815.1	1.72	1.74	1.76	550.0	2.19	2.10	2.03
890.1	820.1	1.27	1.28	1.30	820.1	1.80	1.83	1.85	570.0	2.14	2.04	1.97
895.1	825.1	1.26	1.27	1.29	825.1	1.89	1.92	1.94	590.0	2.29	2.19	2.11
900.1	830.1	1.26	1.27	1.29	830.1	1.98	2.01	2.04	610.0	2.23	2.12	2.05
905.1	835.1	1.26	1.26	1.28	835.1	2.08	2.12	2.15	630.0	2.37	2.25	2.17
910.1	840.1	1.26	1.26	1.28	840.1	2.19	2.22	2.26	650.0	2.31	2.19	2.11
915.1	845.1	1.26	1.25	1.27	845.1	2.30	2.34	2.38	670.0	2.45	2.32	2.23
920.1	850.1	1.26	1.25	1.27	850.1	2.42	2.46	2.50	690.0	2.41	2.29	2.20
925.1	855.1	1.26	1.25	1.25	855.1	2.54	2.58	2.63	710.0	2.52	2.39	2.29
930.1	860.1	1.27	1.25	1.26	860.1	2.66	2.71	2.76	730.0	2.45	2.33	2.24
935.1	865.1	1.27	1.25	1.25	865.1	2.78	2.84	2.89	740.0	2.44	2.31	2.22
940.1	870.1	1.28	1.25	1.25	870.1	2.92	2.97	3.03	760.0	2.61	2.48	2.38
945.1	875.1	1.28	1.24	1.24	2220.1	3.05	3.11	3.17	770.0	2.60	2.49	2.41

## Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	12	14	27	28	35	38	45	46	41	44
1	-	24	+0	28	13	22	28	28	36	30	44	34
2	62	46	59	46	54	47	55	54	66	60	65	61
3	>90	68	64	62	57	57	57	57	62	61	62	60
4	>90	>84	>84	83	81	78	78	79	81	>84	>84	>84
5	>90	>84	>84	>84	>84	>84	>84	84	>84	82	>84	>84
6	>90	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84
7	>90	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84
8	>90	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84
9	>90	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84
10	>90	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

### LO HARMONICS ORDER

Test conditions: RF IN: 835.1 MHz; 1.00 dBm.  
 LO IN: 768.1 MHz; +13.00 dBm  
 IF OUT: 67 MHz; -5.71 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	23	23	40	35	48	41	48	49	48	56
1	-	24	+0	30	13	24	31	31	42	34	44	38
2	42	36	51	36	45	38	45	46	58	52	66	57
3	62	52	42	44	39	40	42	41	47	46	50	47
4	90	71	66	66	70	62	70	60	69	61	64	68
5	>90	69	67	65	70	61	56	55	55	54	59	60
6	>90	75	76	77	77	76	74	75	73	76	73	74
7	>90	86	80	80	78	76	76	75	67	67	65	65
8	>90	87	88	82	82	84	85	83	83	82	79	82
9	>90	>94	>94	>94	91	89	87	83	88	90	77	75
10	>90	>94	>94	>94	>94	91	91	92	94	90	>94	86
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

### LO HARMONICS ORDER

Test conditions: RF IN: 835.1 MHz; 11.00 dBm.  
 LO IN: 768.1 MHz; +13.00 dBm  
 IF OUT: 67 MHz; 4.19 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.