

# Frequency Mixer

# MCA1-24+

## Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB)		
		@LO (dBm)		
		+4	+7	+10
200.0	230.0	17.73	11.37	8.17
280.0	310.0	7.21	5.98	5.68
360.0	390.0	5.34	5.08	4.96
440.0	470.0	5.81	5.28	4.91
520.0	550.0	7.00	6.27	5.80
600.0	630.0	6.53	6.25	6.09
680.0	710.0	6.23	6.04	5.97
760.0	790.0	6.26	5.93	5.83
840.0	870.0	6.83	6.42	6.18
920.0	950.0	6.96	6.59	6.34
1000.0	1030.0	6.81	6.53	6.37
1080.0	1110.0	6.85	6.52	6.34
1160.0	1190.0	7.32	6.72	6.36
1240.0	1270.0	7.47	6.77	6.35
1320.0	1350.0	7.01	6.44	6.06
1400.0	1430.0	6.19	5.64	5.33
1480.0	1510.0	5.91	5.50	5.29
1560.0	1590.0	5.54	4.99	4.82
1640.0	1670.0	5.25	4.96	4.90
1720.0	1750.0	5.36	5.09	5.02
1800.0	1830.0	5.52	5.23	5.14
1880.0	1910.0	5.49	5.19	5.12
1960.0	1990.0	6.06	5.47	5.19
2040.0	2070.0	6.84	6.16	5.76
2120.0	2150.0	7.32	6.62	6.22
2200.0	2230.0	7.26	6.52	6.26
2280.0	2310.0	7.43	6.51	6.28
2340.0	2370.0	7.65	6.45	6.24
2420.0	2450.0	7.85	6.63	6.45
2480.0	2510.0	8.08	7.13	6.96
2560.0	2590.0	9.24	7.63	7.21
2620.0	2650.0	9.62	8.06	7.50
2700.0	2730.0	9.18	8.41	8.01
2760.0	2790.0	8.88	8.59	8.47
2840.0	2870.0	8.50	7.98	7.81
2900.0	2930.0	8.85	8.24	7.93
2980.0	3010.0	8.97	8.45	8.21
3040.0	3070.0	9.70	9.26	9.02
3120.0	3150.0	10.89	10.31	9.96
3180.0	3210.0	11.49	10.82	10.41

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)		
		@LO (dBm)		
		+4	+7	+10
200.0	230.0	-4.13	1.37	8.64
280.0	310.0	4.81	9.01	18.30
360.0	390.0	9.45	11.84	12.68
440.0	470.0	6.92	9.43	12.04
520.0	550.0	6.60	9.67	11.86
600.0	630.0	7.81	8.62	9.49
680.0	710.0	14.00	9.80	11.10
760.0	790.0	9.22	8.67	11.06
840.0	870.0	18.64	16.89	14.99
920.0	950.0	19.12	16.44	14.72
1000.0	1030.0	16.10	19.83	20.39
1080.0	1110.0	11.97	12.82	13.66
1160.0	1190.0	11.36	11.71	11.63
1240.0	1270.0	10.66	10.97	11.72
1320.0	1350.0	6.13	6.36	8.05
1400.0	1430.0	5.54	5.87	5.98
1480.0	1510.0	3.89	4.24	4.92
1560.0	1590.0	8.55	12.32	13.21
1640.0	1670.0	10.78	11.47	12.21
1720.0	1750.0	11.24	14.06	14.10
1800.0	1830.0	8.91	12.17	14.10
1880.0	1910.0	10.24	12.69	13.16
1960.0	1990.0	7.24	8.96	14.27
2040.0	2070.0	10.59	14.97	18.97
2120.0	2150.0	7.28	8.90	11.51
2200.0	2230.0	6.67	9.34	12.13
2280.0	2310.0	6.72	10.77	14.19
2340.0	2370.0	8.01	12.93	15.62
2420.0	2450.0	14.97	16.67	16.74
2480.0	2510.0	10.31	15.12	18.22
2560.0	2590.0	9.35	17.20	16.84
2620.0	2650.0	11.08	14.15	14.95
2700.0	2730.0	11.90	16.13	14.53
2760.0	2790.0	9.18	14.43	15.59
2840.0	2870.0	7.79	8.69	10.30
2900.0	2930.0	10.98	10.41	10.54
2980.0	3010.0	9.87	11.13	12.92
3040.0	3070.0	14.42	16.69	17.78
3120.0	3150.0	14.05	15.90	17.91
3180.0	3210.0	14.21	15.52	16.80

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+1dBm (dB)		
		@LO (dBm)		
		+4	+7	+10
200.0	230.0	-4.34	-0.81	0.39
280.0	310.0	2.14	1.42	0.86
360.0	390.0	2.52	1.93	1.58
440.0	470.0	2.74	2.50	2.25
520.0	550.0	1.60	1.55	1.45
600.0	630.0	1.22	1.00	0.83
680.0	710.0	0.90	0.63	0.51
760.0	790.0	0.95	0.76	0.58
840.0	870.0	0.73	0.55	0.43
920.0	950.0	0.67	0.52	0.40
1000.0	1030.0	0.70	0.48	0.33
1080.0	1110.0	0.86	0.61	0.44
1160.0	1190.0	1.10	0.89	0.69
1240.0	1270.0	1.06	0.86	0.70
1320.0	1350.0	1.71	1.56	1.44
1400.0	1430.0	1.52	1.36	1.26
1480.0	1510.0	1.69	1.37	1.15
1560.0	1590.0	1.49	1.01	0.71
1640.0	1670.0	1.28	0.73	0.49
1720.0	1750.0	1.24	0.75	0.53
1800.0	1830.0	1.40	0.88	0.60
1880.0	1910.0	1.24	0.73	0.42
1960.0	1990.0	1.49	1.22	0.96
2040.0	2070.0	1.19	1.03	0.92
2120.0	2150.0	1.05	0.84	0.73
2200.0	2230.0	1.06	0.70	0.48
2280.0	2310.0	1.00	0.67	0.44
2340.0	2370.0	0.98	0.61	0.36
2420.0	2450.0	0.97	0.54	0.33
2480.0	2510.0	1.00	0.56	0.32
2560.0	2590.0	0.62	0.55	0.34
2620.0	2650.0	0.40	0.46	0.33
2700.0	2730.0	0.49	0.34	0.28
2760.0	2790.0	0.70	0.39	0.29
2840.0	2870.0	0.92	0.72	0.57
2900.0	2930.0	0.65	0.55	0.46
2980.0	3010.0	0.80	0.49	0.31
3040.0	3070.0	0.62	0.37	0.27
3120.0	3150.0	0.50	0.32	0.21
3180.0	3210.0	0.53	0.30	0.21

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## Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1210.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=289.9MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=2410.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+7			+7			+7
770.1	440.0	9.54	10.1	300.0	6.17	830.1	1580.0	10.85
750.1	460.0	9.51	30.1	320.0	5.71	810.1	1600.0	9.96
730.1	480.0	9.32	50.1	340.0	5.72	790.1	1620.0	9.50
710.1	500.0	9.05	70.1	360.0	5.68	770.1	1640.0	9.05
690.1	520.0	8.63	90.1	380.0	5.63	750.1	1660.0	8.68
670.1	540.0	8.17	110.1	400.0	5.58	730.1	1680.0	8.56
650.1	560.0	7.61	130.1	420.0	5.55	710.1	1700.0	8.35
630.1	580.0	6.96	150.1	440.0	5.57	690.1	1720.0	8.23
610.1	600.0	6.29	170.1	460.0	5.67	670.1	1740.0	8.23
590.1	620.0	5.86	190.1	480.0	5.83	650.1	1760.0	8.06
570.1	640.0	5.80	210.1	500.0	5.91	630.1	1780.0	7.86
550.1	660.0	5.86	230.1	520.0	5.98	610.1	1800.0	7.77
530.1	680.0	6.01	250.1	540.0	6.01	590.1	1820.0	7.81
510.1	700.0	6.34	270.1	560.0	6.12	570.1	1840.0	7.71
490.1	720.0	6.77	290.1	580.0	6.12	550.1	1860.0	7.62
470.1	740.0	7.38	310.1	600.0	6.27	530.1	1880.0	7.57
450.1	760.0	7.90	330.1	620.0	6.30	510.1	1900.0	7.59
430.1	780.0	7.99	350.1	640.0	6.22	490.1	1920.0	7.67
410.1	800.0	8.12	370.1	660.0	6.05	470.1	1940.0	7.66
390.1	820.0	7.78	390.1	680.0	5.88	450.1	1960.0	7.69
370.1	840.0	7.73	410.1	700.0	5.92	430.1	1980.0	7.74
350.1	860.0	7.57	430.1	720.0	5.85	410.1	2000.0	7.90
330.1	880.0	7.39	450.1	740.0	6.18	390.1	2020.0	7.98
310.1	900.0	7.24	470.1	760.0	6.16	370.1	2040.0	8.05
290.1	920.0	7.20	490.1	780.0	6.07	350.1	2060.0	8.12
270.1	940.0	7.07	510.1	800.0	6.00	330.1	2080.0	8.08
250.1	960.0	6.91	530.1	820.0	5.85	310.1	2100.0	8.07
230.1	980.0	6.79	550.1	840.0	5.89	290.1	2120.0	7.97
210.1	1000.0	6.72	570.1	860.0	5.90	270.1	2140.0	7.80
190.1	1020.0	6.62	590.1	880.0	5.83	250.1	2160.0	7.65
170.1	1040.0	6.51	610.1	900.0	5.90	230.1	2180.0	7.48
150.1	1060.0	6.43	630.1	920.0	6.00	210.1	2200.0	7.37
130.1	1080.0	6.43	670.1	960.0	5.99	190.1	2220.0	7.10
110.1	1100.0	6.48	690.1	980.0	6.18	170.1	2240.0	6.97
90.1	1120.0	6.50	730.1	1020.0	6.47	150.1	2260.0	6.98
70.1	1140.0	6.48	750.1	1040.0	6.65	130.1	2280.0	7.02
50.1	1160.0	6.44	790.1	1080.0	7.21	90.1	2320.0	6.81
40.1	1170.0	6.48	810.1	1100.0	7.62	70.1	2340.0	6.75
20.1	1190.0	6.50	850.1	1140.0	8.85	30.1	2380.0	6.70
10.1	1200.0	6.62	870.1	1160.0	9.81	10.1	2400.0	6.90

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## Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+4	+7	+10	+4	+7	+10
230.0	49.89	50.29	53.70	27.51	27.31	26.63
310.0	46.64	48.25	48.11	22.20	22.94	24.46
390.0	41.52	41.70	42.04	21.34	23.40	25.20
470.0	38.96	39.95	40.73	22.87	24.99	26.73
550.0	45.84	45.50	45.29	25.29	27.60	29.28
630.0	50.25	50.46	50.35	27.31	27.84	27.72
710.0	44.35	42.87	41.95	27.08	26.26	25.61
790.0	43.51	42.65	41.65	29.15	28.28	27.37
870.0	42.54	43.15	43.62	30.35	30.38	30.28
950.0	41.02	41.32	41.46	25.74	27.28	28.65
1030.0	42.17	42.09	42.05	23.82	24.72	25.28
1110.0	43.90	43.37	42.94	26.42	26.73	26.71
1190.0	44.83	43.69	42.65	29.53	29.95	29.78
1270.0	46.89	44.65	43.52	31.41	32.37	32.77
1350.0	41.33	41.03	40.66	31.31	33.69	35.41
1430.0	46.85	42.06	38.39	29.51	32.51	35.76
1510.0	40.72	38.05	36.16	27.81	30.22	33.02
1590.0	38.99	36.32	34.39	26.16	29.06	32.29
1670.0	36.46	34.03	32.49	26.55	28.96	31.55
1750.0	37.48	35.62	34.06	23.95	25.74	27.86
1830.0	35.52	33.92	32.55	22.04	23.56	25.40
1910.0	34.81	33.48	32.11	21.10	22.51	23.97
1990.0	34.07	32.81	31.84	21.47	22.61	23.98
2070.0	36.00	33.92	32.20	23.72	25.22	26.69
2150.0	34.25	32.68	31.51	22.58	23.66	24.44
2230.0	36.72	34.13	31.73	22.05	22.31	22.15
2310.0	37.58	36.47	34.69	22.47	22.34	21.91
2370.0	36.98	35.98	34.85	24.97	24.94	23.76
2450.0	36.25	34.34	32.01	34.59	32.31	29.24
2510.0	37.88	33.67	30.29	39.23	33.81	29.86
2590.0	41.09	36.06	32.75	34.56	28.16	24.30
2650.0	41.95	36.39	33.37	31.46	25.80	22.65
2730.0	39.96	35.43	33.13	26.95	23.12	21.05
2790.0	36.54	33.19	31.67	24.18	21.86	20.63
2870.0	38.49	35.29	33.39	22.53	21.42	20.75
2930.0	37.81	35.97	34.77	21.80	21.69	21.50
3010.0	33.92	33.06	32.57	20.80	21.32	21.52
3070.0	32.79	32.58	32.38	19.64	20.78	21.48
3150.0	32.64	32.66	32.76	19.23	20.71	21.96
3210.0	33.61	33.94	34.25	19.33	21.05	22.61

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+4	+7	+10
200.0	230.0	31.41	28.18	25.22
280.0	310.0	21.18	19.30	18.35
360.0	390.0	17.31	16.56	15.96
440.0	470.0	14.42	14.02	13.71
520.0	550.0	17.92	17.12	16.71
600.0	630.0	25.56	24.53	23.75
680.0	710.0	30.71	29.60	28.71
760.0	790.0	29.76	28.18	26.68
840.0	870.0	28.69	27.30	26.35
920.0	950.0	29.70	28.76	28.21
1000.0	1030.0	40.06	39.84	39.54
1080.0	1110.0	32.25	31.81	31.43
1160.0	1190.0	28.47	28.11	27.75
1240.0	1270.0	24.41	24.11	24.06
1320.0	1350.0	22.35	21.19	20.55
1400.0	1430.0	23.84	22.97	21.72
1480.0	1510.0	23.12	22.17	21.49
1560.0	1590.0	23.30	23.01	22.72
1640.0	1670.0	23.60	23.68	24.03
1720.0	1750.0	24.04	23.92	23.88
1800.0	1830.0	23.46	23.19	23.10
1880.0	1910.0	23.54	22.72	22.36
1960.0	1990.0	27.37	26.45	25.77
2040.0	2070.0	29.23	28.22	27.43
2120.0	2150.0	23.86	22.52	21.70
2200.0	2230.0	49.60	34.60	30.25
2280.0	2310.0	26.88	25.32	24.31
2340.0	2370.0	26.46	24.40	23.44
2420.0	2450.0	30.38	27.06	25.51
2480.0	2510.0	24.58	22.79	21.96
2560.0	2590.0	20.23	19.77	19.38
2620.0	2650.0	19.09	18.72	18.43
2700.0	2730.0	18.08	17.43	17.09
2760.0	2790.0	17.37	16.64	16.26
2840.0	2870.0	17.10	16.56	16.12
2900.0	2930.0	17.02	16.54	16.11
2980.0	3010.0	16.22	15.77	15.43
3040.0	3070.0	15.40	15.07	14.88
3120.0	3150.0	14.56	14.32	14.07
3180.0	3210.0	14.37	14.03	13.77

# Frequency Mixer

# MCA1-24+

## Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)		
		@LO (dBm)		
		+4	+7	+10
200.0	230.0	10.89	6.58	4.41
280.0	310.0	2.40	2.17	2.16
360.0	390.0	1.57	1.52	1.50
440.0	470.0	2.42	2.23	2.08
520.0	550.0	3.98	3.62	3.37
600.0	630.0	3.74	3.61	3.52
680.0	710.0	3.48	3.18	3.06
760.0	790.0	3.63	3.26	2.94
840.0	870.0	3.99	3.67	3.43
920.0	950.0	4.03	3.70	3.45
1000.0	1030.0	3.73	3.50	3.35
1080.0	1110.0	3.82	3.56	3.37
1160.0	1190.0	4.33	3.98	3.69
1240.0	1270.0	3.94	3.65	3.46
1320.0	1350.0	3.22	2.90	2.73
1400.0	1430.0	2.71	2.34	2.01
1480.0	1510.0	2.07	1.80	1.60
1560.0	1590.0	1.44	1.18	1.09
1640.0	1670.0	1.20	1.05	1.11
1720.0	1750.0	1.16	1.08	1.12
1800.0	1830.0	1.25	1.19	1.19
1880.0	1910.0	1.36	1.28	1.35
1960.0	1990.0	1.84	1.61	1.46
2040.0	2070.0	2.38	2.16	1.99
2120.0	2150.0	2.87	2.65	2.48
2200.0	2230.0	2.97	2.72	2.62
2280.0	2310.0	3.04	2.69	2.57
2340.0	2370.0	3.07	2.65	2.55
2420.0	2450.0	3.10	2.62	2.49
2480.0	2510.0	2.96	2.54	2.37
2560.0	2590.0	3.77	3.30	3.10
2620.0	2650.0	4.21	3.79	3.59
2700.0	2730.0	4.17	3.90	3.76
2760.0	2790.0	3.93	3.75	3.66
2840.0	2870.0	3.95	3.65	3.45
2900.0	2930.0	4.12	3.79	3.54
2980.0	3010.0	3.78	3.48	3.27
3040.0	3070.0	3.95	3.75	3.59
3120.0	3150.0	4.42	4.21	4.04
3180.0	3210.0	4.59	4.37	4.20

LO (MHz)	LO VSWR (:1)		
	@LO (dBm)		
	+4	+7	+10
230.0	31.03	27.16	20.22
310.0	12.89	8.77	7.83
390.0	3.54	3.84	4.61
470.0	1.78	2.34	3.08
550.0	1.27	1.65	2.21
630.0	1.55	1.66	2.12
710.0	1.89	2.09	2.63
790.0	2.34	2.80	3.49
870.0	2.69	3.38	4.27
950.0	2.77	3.66	4.72
1030.0	2.73	3.70	4.83
1110.0	3.12	3.95	5.00
1190.0	3.56	4.16	5.02
1270.0	3.80	4.08	4.70
1350.0	3.90	3.95	4.32
1430.0	3.55	3.40	3.70
1510.0	2.98	2.52	2.65
1590.0	2.54	2.01	2.09
1670.0	2.45	1.87	1.88
1750.0	2.01	1.58	1.71
1830.0	2.02	1.69	1.86
1910.0	2.21	2.00	2.15
1990.0	2.55	2.30	2.42
2070.0	3.01	2.55	2.59
2150.0	3.56	2.65	2.47
2230.0	4.46	2.90	2.39
2310.0	5.52	3.27	2.33
2370.0	6.73	3.89	2.46
2450.0	6.97	4.05	2.50
2510.0	6.35	3.69	2.34
2590.0	6.01	3.60	2.52
2650.0	5.54	3.42	2.66
2730.0	4.47	3.19	2.96
2790.0	3.83	3.23	3.29
2870.0	3.40	3.36	3.67
2930.0	3.17	3.43	3.86
3010.0	2.86	3.26	3.73
3070.0	2.62	3.10	3.60
3150.0	2.63	3.08	3.49
3210.0	2.89	3.25	3.60

IF (OUT) (MHz)	IF VSWR @LO=2400MHz (:1)		
	@LO (dBm)		
	+4	+7	+10
10.0	1.37	1.08	1.26
30.0	1.39	1.08	1.26
50.0	1.43	1.08	1.23
70.0	1.43	1.14	1.27
90.0	1.48	1.15	1.24
110.0	1.51	1.19	1.28
130.0	1.60	1.22	1.25
150.0	1.64	1.27	1.29
170.0	1.70	1.32	1.32
190.0	1.72	1.33	1.34
210.0	1.82	1.38	1.36
230.0	1.90	1.41	1.37
250.0	1.98	1.49	1.43
270.0	2.01	1.47	1.41
290.0	2.09	1.51	1.43
310.0	2.18	1.54	1.41
330.0	2.28	1.62	1.47
350.0	2.34	1.64	1.46
370.0	2.39	1.67	1.47
390.0	2.49	1.72	1.47
410.0	2.57	1.77	1.51
430.0	2.66	1.83	1.55
450.0	2.65	1.81	1.52
470.0	2.72	1.86	1.55
490.0	2.72	1.85	1.54
510.0	2.81	1.92	1.60
530.0	2.75	1.87	1.56
550.0	2.80	1.90	1.59
570.0	2.72	1.87	1.58
590.0	2.75	1.90	1.62
610.0	2.72	1.90	1.65
630.0	2.68	1.88	1.66
650.0	2.66	1.92	1.75
670.0	2.63	1.96	1.84
690.0	2.67	2.07	2.00
710.0	2.61	2.13	2.14
730.0	2.67	2.30	2.35
750.0	2.71	2.52	2.66
790.0	2.99	3.12	3.39
810.0	3.18	3.42	3.72

## Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	6	21	6	24	18	24	43	48	46	49
1	-	15	+0	21	28	25	43	44	34	46	39	50
2	82	55	69	53	59	61	46	61	55	58	64	62
3	>90	56	65	63	51	59	64	67	>70	69	58	68
4	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
5	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
6	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
7	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
8	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
9	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
10	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

Test conditions: RF IN: 1350 MHz; -14.00 dBm.  
 LO IN: 1380 MHz; +7.00 dBm  
 IF OUT: 30 MHz; -20.39 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	16	33	18	37	31	37	52	>80	53	66
1	-	14	+0	24	29	29	46	52	44	60	53	69
2	62	45	54	39	59	52	41	57	51	54	65	67
3	>90	38	45	47	30	42	49	48	60	62	50	61
4	>90	70	65	61	68	56	63	76	56	68	70	65
5	>90	67	64	56	67	67	46	58	59	62	64	70
6	>90	66	74	>80	>80	71	>80	>80	74	77	66	77
7	>90	74	67	>80	76	73	71	>80	60	>80	67	72
8	>90	>80	>80	72	>80	>80	>80	>80	>80	>80	>80	>80
9	>90	>80	>80	>80	>80	>80	>80	>80	>80	>80	71	>80
10	>90	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

### LO HARMONICS ORDER

Test conditions: RF IN: 1350 MHz; -4.00 dBm.  
 LO IN: 1380 MHz; +7.00 dBm  
 IF OUT: 30 MHz; -10.45 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.