

Frequency Mixer

TFM-11+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB)			RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)			RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+1dBm (dB)		
		@LO (dBm)					@LO (dBm)					@LO (dBm)		
		+4	+7	+10			+4	+7	+10			+4	+7	+10
10.1	40.1	5.65	5.40	5.18	10.1	40.1	16.33	15.87	15.32	10.1	40.1	1.38	1.01	0.63
90.4	120.4	5.99	5.79	5.64	90.4	120.4	9.34	8.72	9.91	90.4	120.4	1.31	1.05	0.74
170.6	200.6	6.25	5.95	5.75	170.6	200.6	7.24	8.87	11.47	170.6	200.6	1.37	1.08	0.92
250.9	280.9	6.67	6.24	5.96	250.9	280.9	6.69	9.24	12.50	250.9	280.9	1.39	1.14	0.93
331.1	361.1	6.94	6.45	6.13	331.1	361.1	8.25	11.63	15.25	331.1	361.1	1.40	1.22	1.02
411.4	441.4	7.16	6.60	6.27	411.4	441.4	10.55	14.10	15.53	411.4	441.4	1.43	1.22	1.01
491.6	521.6	7.44	6.80	6.42	491.6	521.6	10.58	12.56	13.52	491.6	521.6	1.35	1.20	1.03
571.9	601.9	7.50	6.87	6.51	571.9	601.9	10.08	11.35	12.24	571.9	601.9	1.33	1.19	1.01
652.1	682.1	7.65	7.04	6.68	652.1	682.1	9.44	10.75	11.65	652.1	682.1	1.23	1.11	0.94
732.4	762.4	7.64	7.12	6.79	732.4	762.4	9.24	10.31	11.41	732.4	762.4	1.18	1.00	0.85
812.6	842.6	7.64	7.12	6.82	812.6	842.6	8.67	9.98	11.34	812.6	842.6	1.11	0.93	0.75
892.9	922.9	7.51	7.06	6.77	892.9	922.9	8.92	10.21	10.91	892.9	922.9	0.97	0.78	0.62
973.1	1003.1	7.59	7.13	6.84	973.1	1003.1	7.84	8.86	10.08	973.1	1003.1	1.02	0.83	0.67
1053.4	1083.4	7.36	6.99	6.75	1053.4	1083.4	7.89	8.65	9.57	1053.4	1083.4	1.07	0.86	0.68
1133.6	1163.6	7.14	6.84	6.64	1133.6	1163.6	8.24	9.18	10.04	1133.6	1163.6	1.01	0.80	0.64
1213.9	1243.9	7.00	6.73	6.57	1213.9	1243.9	8.94	8.98	9.55	1213.9	1243.9	0.90	0.69	0.56
1294.1	1324.1	6.95	6.68	6.53	1294.1	1324.1	9.43	10.23	10.55	1294.1	1324.1	0.81	0.61	0.48
1374.4	1404.4	6.85	6.57	6.43	1374.4	1404.4	10.01	11.37	11.87	1374.4	1404.4	0.71	0.53	0.41
1454.6	1484.6	6.83	6.56	6.42	1454.6	1484.6	9.84	11.27	12.81	1454.6	1484.6	0.72	0.49	0.38
1534.9	1564.9	6.86	6.58	6.43	1534.9	1564.9	10.77	11.20	12.47	1534.9	1564.9	0.73	0.51	0.37
1615.1	1645.1	7.02	6.70	6.53	1615.1	1645.1	11.59	13.06	13.49	1615.1	1645.1	0.73	0.53	0.38
1695.4	1725.4	7.28	6.87	6.67	1695.4	1725.4	11.30	11.56	12.83	1695.4	1725.4	0.70	0.52	0.40
1775.6	1805.6	7.51	7.05	6.79	1775.6	1805.6	12.30	12.22	12.29	1775.6	1805.6	0.71	0.55	0.43
1855.9	1885.9	7.67	7.19	6.91	1855.9	1885.9	10.31	11.08	12.23	1855.9	1885.9	0.70	0.55	0.43
1936.1	1966.1	7.70	7.22	6.94	1936.1	1966.1	9.40	9.62	11.04	1936.1	1966.1	0.70	0.58	0.46
2016.4	2046.4	7.76	7.30	7.02	2016.4	2046.4	9.57	9.46	10.59	2016.4	2046.4	0.70	0.57	0.49
2096.6	2126.6	7.77	7.34	7.06	2096.6	2126.6	9.22	10.13	10.70	2096.6	2126.6	0.77	0.61	0.51
2176.9	2206.9	7.81	7.40	7.13	2176.9	2206.9	8.65	9.60	10.52	2176.9	2206.9	0.73	0.57	0.46
2257.1	2287.1	7.97	7.61	7.37	2257.1	2287.1	9.02	9.64	10.36	2257.1	2287.1	0.65	0.49	0.39
2337.4	2367.4	7.98	7.63	7.44	2337.4	2367.4	9.67	10.47	11.11	2337.4	2367.4	0.59	0.44	0.35
2417.6	2447.6	8.18	7.84	7.65	2417.6	2447.6	10.18	11.20	12.27	2417.6	2447.6	0.48	0.36	0.29
2497.9	2527.9	8.28	7.95	7.78	2497.9	2527.9	11.35	12.30	13.99	2497.9	2527.9	0.48	0.35	0.28
2578.2	2608.2	8.53	8.21	8.02	2578.2	2608.2	11.73	13.14	13.88	2578.2	2608.2	0.38	0.28	0.23
2658.4	2688.4	8.66	8.36	8.18	2658.4	2688.4	10.74	12.52	13.47	2658.4	2688.4	0.36	0.27	0.21
2738.7	2768.7	8.74	8.42	8.25	2738.7	2768.7	10.01	12.23	13.77	2738.7	2768.7	0.33	0.24	0.20
2839.0	2869.0	9.11	8.73	8.56	2839.0	2869.0	10.00	11.65	14.61	2839.0	2869.0	0.29	0.21	0.18
2919.2	2949.2	9.25	8.83	8.67	2919.2	2949.2	13.30	12.29	14.24	2919.2	2949.2	0.27	0.19	0.15
3019.5	3049.5	9.51	9.11	8.91	3019.5	3049.5	15.88	14.17	15.43	3019.5	3049.5	0.27	0.20	0.15
3099.8	3129.8	9.72	9.30	9.06	3099.8	3129.8	16.61	14.63	16.39	3099.8	3129.8	0.23	0.17	0.14
3200.1	3230.1	10.20	9.77	9.51	3200.1	3230.1	18.90	15.35	16.17	3200.1	3230.1	0.21	0.15	0.12



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Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1010.1MHz (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)=2010.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+7			+7			+7
1000.0	10.1	10.62	10.0	20.1	5.58	1110.0	900.1	10.28
979.8	30.3	10.55	50.6	60.7	5.33	1090.0	920.1	10.17
959.6	50.5	10.40	91.3	101.4	5.64	1070.0	940.1	9.98
939.4	70.7	10.33	131.9	142.0	5.73	1050.0	960.1	9.77
919.2	90.9	10.29	172.5	182.6	5.55	1030.0	980.1	9.71
899.0	111.1	10.15	213.2	223.3	5.71	1010.0	1000.1	9.65
878.8	131.3	10.01	253.8	263.9	5.39	990.0	1020.1	9.60
858.6	151.5	9.90	294.4	304.5	5.65	970.0	1040.1	9.45
838.4	171.7	9.76	335.1	345.2	5.46	930.0	1080.1	9.20
818.2	191.9	9.70	375.7	385.8	5.75	910.0	1100.1	9.15
798.0	212.1	9.57	416.3	426.4	5.80	870.0	1140.1	8.96
777.8	232.3	9.44	436.7	446.8	5.81	850.0	1160.1	8.85
757.6	252.5	9.25	477.3	487.4	5.96	810.0	1200.1	8.75
737.3	272.8	9.25	497.6	507.7	6.03	790.0	1220.1	8.72
717.1	293.0	9.18	538.3	548.4	6.03	750.0	1260.1	8.60
696.9	313.2	9.18	558.6	568.7	6.38	730.0	1280.1	8.54
676.7	333.4	8.96	599.2	609.3	6.33	690.0	1320.1	8.45
656.5	353.6	8.90	619.5	629.6	6.47	670.0	1340.1	8.40
636.3	373.8	8.85	660.2	670.3	6.40	630.0	1380.1	8.34
616.1	394.0	8.68	680.5	690.6	6.49	610.0	1400.1	8.31
575.7	434.4	8.51	721.1	731.2	6.86	570.0	1440.1	8.25
555.5	454.6	8.44	741.4	751.5	6.95	550.0	1460.1	8.21
515.1	495.0	8.44	782.1	792.2	7.28	510.0	1500.1	8.12
494.9	515.2	8.43	802.4	812.5	7.50	490.0	1520.1	8.07
454.5	555.6	8.33	843.0	853.1	7.19	450.0	1560.1	7.99
434.3	575.8	8.25	863.3	873.4	7.55	430.0	1580.1	7.96
393.9	616.2	8.03	904.0	914.1	7.84	390.0	1620.1	7.86
373.7	636.4	7.94	924.3	934.4	8.03	370.0	1640.1	7.80
333.3	676.8	7.83	964.9	975.0	8.19	330.0	1680.1	7.70
313.1	697.0	7.80	985.2	995.3	8.20	310.0	1700.1	7.65
272.7	737.4	7.65	1025.9	1036.0	8.43	270.0	1740.1	7.54
252.4	757.7	7.58	1046.2	1056.3	8.65	250.0	1760.1	7.51
212.0	798.1	7.43	1086.8	1096.9	9.09	210.0	1800.1	7.42
191.8	818.3	7.33	1107.1	1117.2	8.88	190.0	1820.1	7.41
151.4	858.7	7.32	1147.8	1157.9	9.25	150.0	1860.1	7.35
131.2	878.9	7.31	1168.1	1178.2	9.52	130.0	1880.1	7.35
90.8	919.3	7.31	1208.7	1218.8	9.75	90.0	1920.1	7.34
70.6	939.5	7.29	1229.0	1239.1	9.77	70.0	1940.1	7.33
30.2	979.9	7.15	1269.7	1279.8	10.25	30.0	1980.1	7.29
10.0	1000.1	7.16	1290.0	1300.1	10.55	10.0	2000.1	7.36

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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
40.1	58.41	59.10	60.15	58.93	59.88	60.55
120.4	51.49	52.10	52.64	55.35	54.11	53.59
200.6	47.85	48.63	49.32	49.63	48.91	49.02
280.9	45.48	46.49	47.38	45.86	45.52	45.74
361.1	43.87	45.12	46.25	42.46	42.68	42.91
441.4	42.60	43.82	44.88	41.92	41.39	40.81
521.6	41.54	42.77	43.74	40.70	39.85	38.90
601.9	40.23	41.43	42.49	38.88	38.12	37.18
682.1	39.06	40.05	40.95	38.80	37.04	35.62
762.4	38.13	38.95	39.69	38.89	36.15	34.27
842.6	37.58	38.21	38.85	38.51	35.18	33.31
922.9	37.06	37.73	38.25	37.71	34.32	32.32
1003.1	36.13	36.79	37.38	37.36	33.86	31.80
1083.4	35.45	36.11	36.70	36.72	33.22	31.25
1163.6	34.75	35.33	35.81	35.98	32.56	30.43
1243.9	34.52	35.11	35.67	35.01	31.69	29.90
1324.1	34.08	34.72	35.16	34.35	31.24	29.22
1404.4	33.83	34.52	35.08	33.46	30.77	28.85
1484.6	33.51	34.40	35.04	32.60	30.49	28.76
1564.9	32.96	34.11	34.89	31.47	30.03	28.41
1645.1	32.50	33.91	34.88	30.93	29.76	28.26
1725.4	31.98	33.37	34.42	31.18	30.12	28.84
1805.6	32.48	34.35	35.77	32.07	31.61	30.99
1885.9	31.63	33.05	34.07	37.25	36.21	35.06
1966.1	31.13	32.37	33.35	35.22	34.85	33.79
2046.4	30.85	31.82	32.60	33.08	33.15	32.48
2126.6	30.81	31.68	32.32	32.16	32.62	32.05
2206.9	30.89	31.66	32.11	31.66	32.61	31.92
2287.1	30.83	31.54	31.86	31.27	32.62	32.18
2367.4	30.94	31.55	31.82	31.18	32.93	32.76
2447.6	31.11	31.38	31.68	31.19	33.12	33.29
2527.9	31.31	31.44	31.67	31.39	33.49	33.90
2608.2	31.25	31.56	31.67	31.67	33.94	34.44
2688.4	31.43	31.75	31.74	32.02	34.39	34.95
2768.7	31.12	31.49	31.81	32.80	35.21	36.03
2869.0	30.96	31.02	31.10	33.79	36.47	37.75
2949.2	31.01	30.87	31.10	34.68	37.14	38.55
3049.5	30.80	30.97	30.97	36.57	39.23	40.63
3129.8	30.87	31.00	31.07	38.41	41.28	43.00
3230.1	31.33	31.36	31.36	41.48	44.40	46.66

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	22.84	22.73	23.02
90.4	120.4	22.86	22.94	23.21
170.6	200.6	23.82	24.49	24.55
250.9	280.9	25.04	25.46	26.03
331.1	361.1	26.51	27.31	27.70
411.4	441.4	26.92	27.51	27.99
491.6	521.6	27.55	27.47	27.47
571.9	601.9	27.47	27.65	27.67
652.1	682.1	26.81	26.71	26.78
732.4	762.4	26.74	26.80	26.84
812.6	842.6	26.95	27.20	27.37
892.9	922.9	27.81	28.24	28.50
973.1	1003.1	30.43	30.91	31.23
1053.4	1083.4	33.09	33.40	33.37
1133.6	1163.6	35.84	35.24	34.52
1213.9	1243.9	37.01	35.65	34.30
1294.1	1324.1	36.90	35.32	34.16
1374.4	1404.4	36.97	35.28	34.38
1454.6	1484.6	35.60	34.88	34.42
1534.9	1564.9	32.88	32.72	32.77
1615.1	1645.1	30.83	30.75	30.71
1695.4	1725.4	30.08	29.93	29.91
1775.6	1805.6	29.57	29.31	29.08
1855.9	1885.9	30.67	30.45	30.24
1936.1	1966.1	30.36	30.25	30.21
2016.4	2046.4	28.75	28.89	28.96
2096.6	2126.6	26.14	26.33	26.57
2176.9	2206.9	23.94	24.13	24.34
2257.1	2287.1	21.83	22.07	22.22
2337.4	2367.4	20.27	20.49	20.65
2417.6	2447.6	19.19	19.33	19.55
2497.9	2527.9	18.35	18.62	18.80
2578.2	2608.2	17.67	17.94	18.18
2658.4	2688.4	17.36	17.60	17.79
2738.7	2768.7	17.07	17.41	17.62
2839.0	2869.0	16.99	17.42	17.76
2919.2	2949.2	16.94	17.41	17.82
3019.5	3049.5	17.55	17.90	18.15
3099.8	3129.8	17.85	18.09	18.28
3200.1	3230.1	18.28	18.35	18.38



Frequency Mixer

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Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)			IF (OUT) (MHz)	IF VSWR @LO=2000MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+4	+7	+10		+4	+7	+10		+4	+7	+10
10.1	40.1	1.06	1.07	1.07	40.1	1.86	2.78	3.96	10.0	1.07	1.12	1.25
90.4	120.4	1.21	1.11	1.05	120.4	1.79	2.59	3.62	30.2	1.01	1.14	1.28
170.6	200.6	1.31	1.24	1.20	200.6	1.72	2.44	3.37	50.4	1.04	1.14	1.28
250.9	280.9	1.57	1.48	1.43	280.9	1.73	2.41	3.28	70.6	1.05	1.16	1.30
331.1	361.1	1.90	1.80	1.73	361.1	1.73	2.39	3.24	90.8	1.06	1.14	1.26
411.4	441.4	2.29	2.15	2.05	441.4	1.75	2.38	3.20	111.0	1.06	1.18	1.31
491.6	521.6	2.75	2.57	2.44	521.6	1.72	2.31	3.09	131.2	1.08	1.18	1.31
571.9	601.9	3.11	2.89	2.75	601.9	1.70	2.24	2.96	151.4	1.12	1.23	1.35
652.1	682.1	3.37	3.15	2.99	682.1	1.68	2.16	2.83	171.6	1.11	1.21	1.33
732.4	762.4	3.47	3.25	3.11	762.4	1.67	2.09	2.70	191.8	1.14	1.24	1.36
812.6	842.6	3.48	3.27	3.13	842.6	1.64	2.02	2.58	212.0	1.14	1.25	1.38
892.9	922.9	3.34	3.17	3.03	922.9	1.64	1.96	2.48	232.2	1.18	1.30	1.43
973.1	1003.1	3.61	3.43	3.30	1003.1	1.60	1.88	2.37	252.4	1.20	1.33	1.46
1053.4	1083.4	3.37	3.22	3.11	1083.4	1.58	1.81	2.26	272.7	1.21	1.32	1.45
1133.6	1163.6	2.95	2.83	2.75	1163.6	1.54	1.75	2.18	292.9	1.24	1.36	1.50
1213.9	1243.9	2.54	2.43	2.35	1243.9	1.53	1.70	2.11	313.1	1.24	1.37	1.50
1294.1	1324.1	2.25	2.12	2.04	1324.1	1.50	1.65	2.03	333.3	1.31	1.45	1.59
1374.4	1404.4	2.10	1.97	1.87	1404.4	1.48	1.60	1.97	353.5	1.30	1.44	1.57
1454.6	1484.6	1.96	1.83	1.74	1484.6	1.47	1.58	1.94	373.7	1.34	1.48	1.62
1534.9	1564.9	1.87	1.72	1.62	1564.9	1.46	1.58	1.94	393.9	1.34	1.49	1.63
1615.1	1645.1	1.73	1.60	1.51	1645.1	1.44	1.59	1.97	434.3	1.42	1.59	1.75
1695.4	1725.4	1.64	1.51	1.43	1725.4	1.42	1.58	1.97	454.5	1.45	1.61	1.76
1775.6	1805.6	1.61	1.48	1.39	1805.6	1.43	1.62	2.01	494.9	1.49	1.66	1.81
1855.9	1885.9	1.59	1.48	1.40	1885.9	1.43	1.63	2.04	515.1	1.56	1.74	1.91
1936.1	1966.1	1.67	1.55	1.47	1966.1	1.43	1.65	2.04	555.5	1.62	1.81	1.99
2016.4	2046.4	1.77	1.66	1.58	2046.4	1.43	1.66	2.06	575.7	1.61	1.80	1.97
2096.6	2126.6	1.86	1.78	1.71	2126.6	1.43	1.68	2.08	616.1	1.71	1.92	2.10
2176.9	2206.9	1.81	1.77	1.73	2206.9	1.44	1.68	2.08	636.3	1.76	1.97	2.15
2257.1	2287.1	1.71	1.70	1.69	2287.1	1.43	1.65	2.04	676.7	1.80	2.01	2.20
2337.4	2367.4	1.63	1.62	1.61	2367.4	1.41	1.61	1.99	696.9	1.88	2.10	2.30
2417.6	2447.6	1.66	1.64	1.63	2447.6	1.41	1.59	1.94	737.3	1.98	2.21	2.40
2497.9	2527.9	1.82	1.80	1.78	2527.9	1.44	1.59	1.92	757.6	1.97	2.19	2.38
2578.2	2608.2	1.98	1.96	1.94	2608.2	1.45	1.59	1.92	798.0	2.09	2.32	2.52
2658.4	2688.4	2.06	2.06	2.06	2688.4	1.44	1.55	1.86	818.2	2.17	2.41	2.61
2738.7	2768.7	1.93	1.94	1.95	2768.7	1.44	1.52	1.79	858.6	2.22	2.46	2.66
2839.0	2869.0	1.93	1.94	1.96	2869.0	1.41	1.49	1.76	878.8	2.30	2.54	2.74
2919.2	2949.2	1.74	1.76	1.78	2949.2	1.38	1.49	1.75	919.2	2.43	2.68	2.89
3019.5	3049.5	1.75	1.76	1.79	3049.5	1.32	1.47	1.74	939.4	2.42	2.66	2.86
3099.8	3129.8	1.56	1.58	1.61	3129.8	1.28	1.47	1.74	979.8	2.55	2.79	2.99
3200.1	3230.1	1.64	1.67	1.70	3230.1	1.27	1.49	1.77	1000.0	2.74	2.94	3.07



Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	5	39	19	51	23	39	33	50	45	>69
1	-	24	+0	37	36	44	30	37	46	36	43	42
2	>90	>69	59	66	63	>69	58	>69	59	65	61	>69
3	>90	>69	>69	>69	53	>69	>69	>69	65	>69	>69	67
4	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
5	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
6	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
7	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
8	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
9	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
10	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 1000 MHz; -14.00 dBm.
 LO IN: 1030 MHz; +7.00 dBm
 IF OUT: 30 MHz; -21.31 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	15	50	30	55	35	47	48	59	59	73
1	-	25	+0	38	36	49	31	41	50	43	52	53
2	70	69	49	51	54	77	52	69	55	69	60	75
3	>90	50	56	60	36	71	63	63	51	55	63	55
4	>90	>79	72	>79	71	66	72	>79	68	>79	70	71
5	>90	72	67	72	75	75	53	>79	74	>79	64	66
6	>90	>79	>79	>79	>79	>79	>79	77	>79	>79	78	>79
7	>90	>79	>79	>79	>79	>79	>79	>79	65	>79	>79	>79
8	>90	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
9	>90	>79	>79	>79	>79	>79	>79	>79	>79	>79	79	>79
10	>90	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 1000 MHz; -4.00 dBm.
 LO IN: 1030 MHz; +7.00 dBm
 IF OUT: 30 MHz; -11.17 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.