

# Frequency Mixer

# SYM-18H

## 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=+14dBm (dB)		
		@LO (dBm)					@LO (dBm)					@LO (dBm)		
		+14	+17	+20			+14	+17	+20			+14	+17	+20
5.0	35.0	6.11	5.61	5.31	10.0	40.0	24.17	22.45	22.44	10.0	40.0	0.95	0.73	0.28
8.0	38.0	5.83	5.53	5.33	90.3	120.3	24.28	23.29	23.25	90.3	120.3	1.08	0.69	0.47
10.0	40.0	6.06	5.56	5.36	170.6	200.6	20.88	21.20	22.96	170.6	200.6	1.00	0.67	0.46
90.3	120.3	6.21	5.74	5.50	250.9	280.9	20.88	22.12	23.43	250.9	280.9	1.10	0.73	0.63
170.6	200.6	6.38	5.91	5.68	331.2	361.2	20.58	22.53	25.32	331.2	361.2	1.07	0.93	0.73
250.9	280.9	6.57	6.06	5.64	411.5	441.5	19.72	22.39	25.54	411.5	441.5	0.94	0.98	0.84
331.2	361.2	6.87	6.02	5.61	491.7	521.7	21.12	24.38	29.54	491.7	521.7	1.13	1.12	0.82
411.5	441.5	7.19	6.25	5.76	552.0	582.0	23.62	26.84	31.04	552.0	582.0	1.47	1.16	0.87
491.7	521.7	7.14	6.12	5.77	632.3	662.3	26.60	30.15	30.48	632.3	662.3	1.42	1.02	0.83
552.0	582.0	6.82	6.07	5.78	692.5	722.5	31.31	27.77	27.42	692.5	722.5	1.35	0.90	0.70
632.3	662.3	6.70	6.14	5.90	772.8	802.8	28.42	27.24	27.01	772.8	802.8	1.03	0.73	0.58
692.5	722.5	6.89	6.28	6.04	833.0	863.0	28.64	28.10	27.35	833.0	863.0	0.93	0.54	0.43
772.8	802.8	7.08	6.54	6.32	913.3	943.3	27.48	29.35	28.09	913.3	943.3	0.66	0.41	0.30
833.0	863.0	7.35	6.75	6.50	973.5	1003.5	27.54	28.26	27.36	973.5	1003.5	0.66	0.38	0.28
913.3	943.3	7.38	6.85	6.61	1053.8	1083.8	26.28	25.58	26.31	1053.8	1083.8	0.54	0.30	0.23
973.5	1003.5	7.55	6.86	6.61	1114.0	1144.0	26.53	25.43	25.80	1114.0	1144.0	0.47	0.23	0.18
1053.8	1083.8	7.53	6.87	6.63	1194.3	1224.3	25.86	24.97	25.85	1194.3	1224.3	0.38	0.19	0.14
1194.3	1224.3	7.77	6.99	6.72	1254.5	1284.5	27.72	27.13	26.90	1254.5	1284.5	0.38	0.20	0.14
1254.5	1284.5	8.00	7.02	6.72	1334.8	1364.8	28.85	24.68	25.83	1334.8	1364.8	0.38	0.18	0.12
1334.8	1364.8	7.98	7.07	6.79	1395.0	1425.0	26.50	27.88	25.95	1395.0	1425.0	0.40	0.20	0.13
1395.0	1425.0	8.25	7.19	6.84	1475.3	1505.3	26.79	27.70	26.68	1475.3	1505.3	0.40	0.20	0.11
1475.3	1505.3	8.19	7.23	6.89	1535.5	1565.5	23.71	33.82	26.48	1535.5	1565.5	0.46	0.23	0.14
1535.5	1565.5	8.33	7.25	6.91	1615.8	1645.8	23.46	29.30	29.04	1615.8	1645.8	0.46	0.22	0.12
1615.8	1645.8	8.53	7.43	7.07	1676.0	1706.0	22.32	30.61	29.31	1676.0	1706.0	0.50	0.22	0.10
1676.0	1706.0	8.78	7.62	7.23	1756.3	1786.3	22.54	36.30	29.09	1756.3	1786.3	0.52	0.20	0.09
1756.3	1786.3	9.02	7.88	7.53	1816.5	1846.5	23.54	38.22	28.03	1816.5	1846.5	0.53	0.20	0.08
1816.5	1846.5	9.24	8.16	7.74	1896.8	1926.8	24.13	31.14	28.71	1896.8	1926.8	0.63	0.30	0.12
1896.8	1926.8	9.61	8.51	8.04	1957.0	1987.0	26.47	28.62	26.84	1957.0	1987.0	0.64	0.40	0.21
1957.0	1987.0	9.68	8.61	8.16	2037.3	2067.3	29.46	26.36	25.90	2037.3	2067.3	0.81	0.60	0.42
2037.3	2067.3	9.98	8.88	8.32	2097.6	2127.6	28.24	25.46	24.09	2097.6	2127.6	0.98	0.77	0.61
2097.6	2127.6	10.10	9.02	8.41	2177.8	2207.8	23.60	22.67	22.93	2177.8	2207.8	1.35	1.02	0.77
2177.8	2207.8	10.02	8.98	8.40	2238.1	2268.1	21.64	21.21	21.38	2238.1	2268.1	1.57	1.22	0.99
2238.1	2268.1	9.70	8.78	8.27	2318.4	2348.4	19.87	19.98	20.25	2318.4	2348.4	2.00	1.42	1.10
2318.4	2348.4	9.55	8.72	8.19	2378.6	2408.6	18.72	19.11	19.47	2378.6	2408.6	2.37	1.59	1.14
2378.6	2408.6	9.41	8.64	8.19	2458.9	2488.9	18.02	18.67	19.31	2458.9	2488.9	2.72	1.66	1.18
2458.9	2488.9	9.50	8.73	8.35	2519.1	2549.1	17.90	18.59	19.38	2519.1	2549.1	2.74	1.61	1.11
2519.1	2549.1	10.12	9.44	9.02	2599.4	2629.4	17.62	18.80	19.60	2599.4	2629.4	2.96	1.59	0.92
2599.4	2629.4	10.29	9.60	9.17	2659.6	2689.6	17.83	18.90	19.74	2659.6	2689.6	2.76	1.47	0.84
2659.6	2689.6	10.72	9.87	9.48	2739.9	2769.9	17.36	19.10	20.09	2739.9	2769.9	3.11	1.62	0.74
2739.9	2769.9	11.09	10.18	9.73	2800.1	2830.1	17.29	19.46	20.48	2800.1	2830.1	3.11	1.61	0.66



# Frequency Mixer

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## Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=900.1MHz (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)=1800.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+17			+17			+17
890.0	10.1	6.78	10.0	20.1	5.86	1500.0	300.1	8.61
869.5	30.6	6.96	50.8	60.9	5.79	1459.2	340.9	8.54
849.1	51.0	7.03	91.6	101.7	5.73	1418.4	381.7	8.53
828.6	71.5	7.10	132.5	142.6	5.65	1377.5	422.6	8.41
808.1	92.0	7.22	173.3	183.4	5.76	1336.7	463.4	8.34
787.7	112.4	7.21	214.1	224.2	5.67	1295.9	504.2	8.30
767.2	132.9	7.21	254.9	265.0	5.72	1255.1	545.0	8.24
746.7	153.4	7.35	295.8	305.9	5.71	1214.2	585.9	8.12
726.3	173.8	7.36	336.6	346.7	5.58	1173.4	626.7	8.06
705.8	194.3	7.41	377.4	387.5	5.59	1132.6	667.5	8.01
685.3	214.8	7.42	418.2	428.3	5.64	1091.8	708.3	8.01
664.9	235.2	7.42	459.0	469.1	5.59	1051.0	749.1	7.93
644.4	255.7	7.49	499.9	510.0	5.55	1010.1	790.0	7.93
624.0	276.1	7.59	540.7	550.8	5.53	969.3	830.8	7.90
603.5	296.6	7.51	581.5	591.6	5.58	928.5	871.6	7.87
583.0	317.1	7.38	622.3	632.4	5.60	887.7	912.4	7.82
562.6	337.5	7.33	663.2	673.3	5.66	846.8	953.3	7.84
542.1	358.0	7.36	704.0	714.1	5.73	806.0	994.1	7.81
521.6	378.5	7.31	744.8	754.9	5.75	765.2	1034.9	7.77
501.2	398.9	7.36	785.6	795.7	5.81	724.4	1075.7	7.74
480.7	419.4	7.17	826.4	836.5	5.87	683.6	1116.5	7.69
460.2	439.9	7.33	867.3	877.4	6.00	642.7	1157.4	7.79
439.8	460.3	7.22	908.1	918.2	6.05	601.9	1198.2	7.79
419.3	480.8	7.10	948.9	959.0	6.14	561.1	1239.0	7.80
398.8	501.3	7.15	989.7	999.8	6.21	520.3	1279.8	7.78
378.4	521.7	7.05	1030.5	1040.6	6.21	479.5	1320.6	7.76
357.9	542.2	7.01	1071.4	1081.5	6.28	438.6	1361.5	7.73
337.4	562.7	7.01	1112.2	1122.3	6.25	397.8	1402.3	7.75
317.0	583.1	6.98	1153.0	1163.1	6.30	357.0	1443.1	7.72
296.5	603.6	6.96	1193.8	1203.9	6.35	316.2	1483.9	7.68
276.0	624.1	6.92	1234.7	1244.8	6.44	275.3	1524.8	7.70
255.6	644.5	6.94	1255.1	1265.2	6.45	254.9	1545.2	7.71
214.7	685.4	6.84	1295.9	1306.0	6.58	214.1	1586.0	7.64
194.2	705.9	6.85	1316.3	1326.4	6.67	193.7	1606.4	7.72
153.3	746.8	6.80	1357.1	1367.2	6.81	152.9	1647.2	7.77
132.8	767.3	6.80	1377.5	1387.6	6.89	132.5	1667.6	7.75
91.9	808.2	6.82	1418.4	1428.5	7.03	91.6	1708.5	7.80
71.4	828.7	6.79	1438.8	1448.9	7.08	71.2	1728.9	7.76
30.5	869.6	6.86	1479.6	1489.7	7.16	30.4	1769.7	7.89
10.0	890.1	6.98	1500.0	1510.1	7.21	10.0	1790.1	7.94



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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	44.90	50.30	54.60	36.10	38.90	41.70
8.0	45.60	50.90	54.80	36.40	39.40	42.10
10.0	45.70	51.30	55.20	36.40	39.60	42.40
90.3	52.38	53.45	53.65	37.48	41.63	46.34
170.6	46.81	47.14	47.39	39.85	45.14	48.41
250.9	43.84	43.92	44.03	42.66	48.71	44.54
331.2	42.60	42.19	42.31	46.99	49.92	41.80
411.5	42.02	41.38	41.15	48.22	47.65	39.93
491.7	41.81	41.31	40.62	48.54	45.79	39.27
552.0	42.22	41.48	40.38	48.84	43.34	38.29
632.3	43.01	41.41	40.41	45.35	42.11	38.66
692.5	42.58	41.01	40.00	41.71	40.36	38.15
772.8	42.46	40.96	39.97	38.94	39.47	38.32
833.0	43.02	41.16	39.85	37.56	38.92	38.16
913.3	44.18	42.22	40.59	35.96	38.20	38.70
973.5	44.62	42.55	40.97	35.48	37.79	39.00
1053.8	45.38	43.73	41.96	33.70	36.32	38.23
1194.3	47.56	45.51	43.89	30.40	33.52	35.83
1254.5	48.78	46.90	44.95	29.87	32.50	34.70
1334.8	51.51	50.64	48.53	28.25	30.95	33.20
1395.0	53.11	55.69	51.67	28.02	30.22	32.16
1475.3	52.12	62.55	64.16	27.46	29.49	31.03
1535.5	51.56	54.36	52.90	27.73	29.44	30.73
1615.8	50.82	48.11	45.49	27.76	29.34	30.43
1676.0	47.95	44.40	42.15	28.43	29.81	30.70
1756.3	44.33	41.04	39.30	28.79	30.20	31.26
1816.5	40.51	38.07	37.05	29.25	30.56	31.95
1896.8	37.97	36.22	35.32	30.04	31.33	32.52
1957.0	36.40	35.16	34.54	30.64	32.15	33.33
2037.3	35.57	34.78	34.35	30.92	32.31	33.78
2097.6	35.14	34.59	34.37	31.40	32.87	34.33
2177.8	34.35	34.06	34.25	31.85	33.17	34.62
2238.1	33.75	33.56	33.88	32.05	33.30	34.41
2318.4	32.85	33.00	33.45	32.60	33.74	34.73
2378.6	31.84	32.40	33.11	33.01	34.06	34.85
2458.9	30.41	31.25	32.43	33.37	34.14	34.97
2599.4	28.15	29.19	30.16	33.11	33.72	34.09
2659.6	27.90	29.12	29.97	32.71	33.29	33.55
2739.9	27.92	29.20	29.97	31.85	32.26	32.38
2800.1	27.91	29.09	30.04	31.40	31.70	31.89

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+14	+17	+20
10.0	40.0	24.16	24.41	24.49
90.3	120.3	29.42	29.55	29.71
170.6	200.6	31.04	31.28	31.29
250.9	280.9	32.53	32.69	32.77
331.2	361.2	33.45	33.60	33.05
411.5	441.5	35.24	34.98	33.80
491.7	521.7	39.72	36.76	35.45
552.0	582.0	41.27	37.16	35.27
632.3	662.3	42.42	39.94	37.94
692.5	722.5	46.94	42.37	40.05
772.8	802.8	48.57	45.05	43.23
833.0	863.0	48.24	45.75	44.42
913.3	943.3	46.95	45.79	45.53
973.5	1003.5	47.18	47.68	46.99
1053.8	1083.8	45.41	47.84	48.38
1114.0	1144.0	43.89	47.52	49.77
1194.3	1224.3	41.96	45.32	48.01
1254.5	1284.5	39.57	43.60	46.26
1334.8	1364.8	36.67	38.67	39.71
1395.0	1425.0	35.00	36.67	37.67
1475.3	1505.3	33.75	34.52	35.35
1535.5	1565.5	33.01	33.63	34.13
1615.8	1645.8	32.64	32.99	33.27
1676.0	1706.0	32.51	32.67	32.75
1756.3	1786.3	32.50	32.79	32.84
1816.5	1846.5	32.71	33.03	33.03
1896.8	1926.8	33.24	33.62	33.89
1957.0	1987.0	33.99	34.60	34.98
2037.3	2067.3	34.88	35.91	36.73
2097.6	2127.6	36.01	36.63	37.52
2177.8	2207.8	36.96	37.58	37.93
2238.1	2268.1	37.07	37.07	36.97
2318.4	2348.4	36.09	35.48	34.94
2378.6	2408.6	34.97	34.25	33.82
2458.9	2488.9	33.95	33.16	32.45
2519.1	2549.1	33.40	32.56	31.92
2599.4	2629.4	33.99	32.86	31.88
2659.6	2689.6	34.88	33.77	32.83
2739.9	2769.9	36.36	35.15	34.21
2800.1	2830.1	35.75	34.76	34.43

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## Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)		
		@LO (dBm)		
		+14	+17	+20
5.0	35.0	1.68	1.58	1.52
8.0	38.0	1.47	1.36	1.31
10.0	40.0	1.44	1.31	1.25
90.3	120.3	1.46	1.28	1.17
170.6	200.6	1.54	1.37	1.27
250.9	280.9	1.63	1.47	1.35
331.2	361.2	1.82	1.60	1.48
411.5	441.5	2.05	1.81	1.66
491.7	521.7	2.21	1.95	1.82
552.0	582.0	2.24	2.03	1.92
632.3	662.3	2.34	2.18	2.07
692.5	722.5	2.47	2.30	2.18
772.8	802.8	2.59	2.42	2.31
833.0	863.0	2.73	2.52	2.38
913.3	943.3	2.78	2.59	2.46
973.5	1003.5	2.89	2.63	2.50
1053.8	1083.8	2.88	2.64	2.51
1194.3	1224.3	2.89	2.59	2.44
1254.5	1284.5	2.88	2.54	2.36
1334.8	1364.8	2.77	2.44	2.26
1395.0	1425.0	2.77	2.38	2.18
1475.3	1505.3	2.66	2.30	2.11
1535.5	1565.5	2.63	2.26	2.05
1615.8	1645.8	2.55	2.22	2.01
1676.0	1706.0	2.50	2.20	2.01
1756.3	1786.3	2.44	2.18	2.02
1816.5	1846.5	2.43	2.20	2.07
1896.8	1926.8	2.43	2.23	2.11
1957.0	1987.0	2.39	2.22	2.11
2037.3	2067.3	2.34	2.18	2.06
2097.6	2127.6	2.26	2.11	2.00
2177.8	2207.8	2.12	1.98	1.89
2238.1	2268.1	1.96	1.84	1.76
2318.4	2348.4	1.76	1.66	1.60
2378.6	2408.6	1.58	1.49	1.43
2458.9	2488.9	1.38	1.29	1.25
2599.4	2629.4	1.16	1.16	1.19
2659.6	2689.6	1.14	1.19	1.25
2739.9	2769.9	1.15	1.25	1.35
2800.1	2830.1	1.21	1.33	1.43

LO (MHz)	LO VSWR (:1)		
	@LO (dBm)		
	+14	+17	+20
5.0	1.10	1.80	2.80
8.0	1.08	1.78	2.80
10.0	1.07	1.78	2.80
90.3	1.05	1.59	2.35
170.6	1.11	1.53	2.20
250.9	1.15	1.49	2.15
331.2	1.24	1.50	2.14
411.5	1.25	1.48	2.13
491.7	1.23	1.34	1.91
552.0	1.33	1.34	1.92
632.3	1.48	1.29	1.78
692.5	1.60	1.32	1.78
772.8	1.77	1.33	1.65
833.0	1.86	1.34	1.62
913.3	2.06	1.36	1.49
973.5	2.05	1.34	1.43
1053.8	2.27	1.37	1.31
1194.3	2.43	1.36	1.17
1254.5	2.17	1.33	1.11
1334.8	2.38	1.37	1.15
1395.0	2.23	1.40	1.21
1475.3	2.38	1.49	1.35
1535.5	2.21	1.52	1.46
1615.8	2.33	1.64	1.62
1676.0	2.14	1.70	1.76
1756.3	2.20	1.81	1.91
1816.5	2.14	1.87	2.03
1896.8	2.09	1.94	2.15
1957.0	2.01	2.01	2.29
2037.3	2.01	2.06	2.34
2097.6	1.99	2.13	2.45
2177.8	2.00	2.22	2.57
2238.1	2.00	2.26	2.59
2318.4	2.05	2.36	2.70
2378.6	2.09	2.44	2.78
2458.9	2.16	2.52	2.88
2599.4	2.27	2.63	2.96
2659.6	2.35	2.71	3.00
2739.9	2.48	2.81	3.10
2800.1	2.54	2.83	3.14

IF (OUT) (MHz)	IF VSWR @LO=1800.1MHz (:1)		
	@LO (dBm)		
	+14	+17	+20
10.0	1.18	1.21	1.43
49.7	1.30	1.16	1.28
89.5	1.28	1.16	1.31
129.2	1.36	1.22	1.32
168.9	1.37	1.25	1.36
208.7	1.39	1.27	1.39
248.4	1.42	1.34	1.44
288.1	1.45	1.39	1.50
327.9	1.46	1.43	1.55
367.6	1.49	1.49	1.61
407.3	1.50	1.51	1.64
447.1	1.53	1.55	1.67
486.8	1.53	1.56	1.67
526.5	1.55	1.57	1.68
566.3	1.54	1.58	1.69
606.0	1.55	1.57	1.67
645.7	1.54	1.57	1.68
685.5	1.54	1.56	1.65
725.2	1.54	1.56	1.65
764.9	1.50	1.52	1.61
804.7	1.53	1.53	1.59
844.4	1.47	1.47	1.55
884.1	1.46	1.41	1.46
923.9	1.43	1.39	1.44
963.6	1.35	1.27	1.33
1003.3	1.36	1.26	1.29
1043.1	1.27	1.17	1.23
1082.8	1.29	1.10	1.13
1122.5	1.27	1.07	1.11
1162.3	1.27	1.05	1.09
1202.0	1.30	1.09	1.12
1241.7	1.34	1.18	1.20
1281.5	1.42	1.26	1.26
1321.2	1.46	1.32	1.33
1360.9	1.52	1.40	1.39
1380.8	1.55	1.45	1.46
1420.5	1.64	1.52	1.52
1440.4	1.70	1.59	1.59
1480.1	1.73	1.63	1.63
1500.0	1.82	1.72	1.73

## Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	16	24	21	24	23	35	41	39	37	40
1	-	38	+0	37	17	55	20	48	57	48	38	50
2	89	77	59	63	57	62	59	62	61	72	67	68
3	>100	83	60	82	61	82	59	82	61	89	69	87
4	>100	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92
5	>100	>92	>92	>92	>92	>92	89	>92	>92	>92	>92	>92
6	>100	>92	>92	>92	>92	>92	>92	>92	>92	>92	>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: 900.1 MHz; -1.00 dBm.  
 LO IN: 930.01 MHz; +17.00 dBm  
 IF OUT: 29.91 MHz; -7.98 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	26	33	32	36	35	48	56	56	56	64
1	-	38	+0	37	16	53	20	50	50	52	45	55
2	73	59	51	51	49	54	49	53	53	66	59	62
3	>100	65	39	64	44	65	40	66	49	69	53	66
4	>100	84	77	66	73	66	73	68	81	67	74	81
5	>100	86	65	79	56	80	57	76	59	84	57	79
6	>100	>102	88	83	83	81	86	77	84	77	82	79
7	>100	>102	92	99	78	98	73	93	70	90	72	88
8	>100	>102	>102	>102	99	94	98	92	98	89	99	88
9	>100	>102	>102	>102	>102	>102	93	>102	89	101	86	>102
10	>100	>102	>102	>102	>102	>102	>102	>102	>102	>102	>102	>102
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

### LO HARMONICS ORDER

Test conditions: RF IN: 900.1 MHz; 9.00 dBm.  
 LO IN: 930.01 MHz; +17.00 dBm  
 IF OUT: 29.91 MHz; 2.03 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.

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