

# Frequency Mixer

# SYM-20DHW+

## 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  |
| 10.1          | 40.1     | 6.28   | 5.75  | 5.53 | 10.1          | 40.1     | 33.12           | 34.60 | 32.38 | 10.1          | 40.1     | 0.92                           | 0.52 | 0.35 |
| 90.8          | 120.8    | 6.43   | 5.84  | 5.60 | 90.8          | 120.8    | 29.97           | 31.10 | 29.20 | 90.8          | 120.8    | 1.00                           | 0.63 | 0.43 |
| 171.6         | 201.6    | 6.49   | 5.95  | 5.70 | 171.6         | 201.6    | 27.42           | 27.02 | 29.75 | 171.6         | 201.6    | 0.96                           | 0.63 | 0.49 |
| 252.3         | 282.3    | 6.65   | 6.09  | 5.80 | 252.3         | 282.3    | 25.77           | 28.44 | 30.49 | 252.3         | 282.3    | 1.07                           | 0.72 | 0.53 |
| 333.0         | 363.0    | 6.83   | 6.20  | 5.85 | 333.0         | 363.0    | 26.75           | 29.70 | 31.97 | 333.0         | 363.0    | 1.05                           | 0.74 | 0.62 |
| 413.8         | 443.8    | 7.14   | 6.40  | 5.94 | 413.8         | 443.8    | 27.02           | 29.99 | 33.51 | 413.8         | 443.8    | 0.91                           | 0.75 | 0.66 |
| 494.5         | 524.5    | 7.43   | 6.52  | 6.02 | 494.5         | 524.5    | 27.59           | 31.00 | 35.09 | 494.5         | 524.5    | 0.77                           | 0.77 | 0.70 |
| 575.3         | 605.3    | 7.61   | 6.57  | 6.13 | 575.3         | 605.3    | 28.00           | 33.14 | 37.81 | 575.3         | 605.3    | 0.78                           | 0.82 | 0.72 |
| 656.0         | 686.0    | 7.75   | 6.78  | 6.32 | 656.0         | 686.0    | 29.56           | 33.87 | 38.36 | 656.0         | 686.0    | 0.67                           | 0.73 | 0.63 |
| 736.7         | 766.7    | 8.03   | 6.98  | 6.48 | 736.7         | 766.7    | 27.57           | 32.35 | 35.13 | 736.7         | 766.7    | 0.53                           | 0.67 | 0.60 |
| 817.5         | 847.5    | 7.86   | 6.84  | 6.41 | 817.5         | 847.5    | 28.86           | 32.86 | 34.91 | 817.5         | 847.5    | 0.71                           | 0.73 | 0.62 |
| 898.2         | 928.2    | 7.57   | 6.73  | 6.37 | 898.2         | 928.2    | 31.11           | 33.24 | 35.81 | 898.2         | 928.2    | 0.95                           | 0.74 | 0.58 |
| 978.9         | 1008.9   | 7.32   | 6.58  | 6.26 | 978.9         | 1008.9   | 32.98           | 33.65 | 34.03 | 978.9         | 1008.9   | 1.22                           | 0.81 | 0.65 |
| 1059.7        | 1089.7   | 7.13   | 6.47  | 6.19 | 1059.7        | 1089.7   | 32.90           | 33.50 | 33.61 | 1059.7        | 1089.7   | 1.29                           | 0.91 | 0.72 |
| 1140.4        | 1170.4   | 7.10   | 6.48  | 6.20 | 1140.4        | 1170.4   | 32.16           | 30.85 | 32.23 | 1140.4        | 1170.4   | 1.17                           | 0.84 | 0.65 |
| 1221.1        | 1251.1   | 7.17   | 6.55  | 6.28 | 1221.1        | 1251.1   | 30.13           | 30.74 | 31.56 | 1221.1        | 1251.1   | 1.09                           | 0.70 | 0.59 |
| 1301.9        | 1331.9   | 7.10   | 6.54  | 6.29 | 1301.9        | 1331.9   | 29.35           | 30.58 | 30.75 | 1301.9        | 1331.9   | 1.08                           | 0.61 | 0.47 |
| 1382.6        | 1412.6   | 6.98   | 6.45  | 6.25 | 1382.6        | 1412.6   | 28.76           | 29.65 | 30.62 | 1382.6        | 1412.6   | 1.13                           | 0.62 | 0.46 |
| 1463.4        | 1493.4   | 7.03   | 6.45  | 6.27 | 1463.4        | 1493.4   | 28.62           | 30.17 | 31.52 | 1463.4        | 1493.4   | 1.10                           | 0.60 | 0.41 |
| 1544.1        | 1574.1   | 7.16   | 6.51  | 6.32 | 1544.1        | 1574.1   | 30.55           | 31.21 | 31.89 | 1544.1        | 1574.1   | 1.07                           | 0.58 | 0.37 |
| 1624.8        | 1654.8   | 7.47   | 6.65  | 6.43 | 1624.8        | 1654.8   | 35.97           | 32.19 | 32.25 | 1624.8        | 1654.8   | 0.97                           | 0.56 | 0.34 |
| 1705.6        | 1735.6   | 7.83   | 6.88  | 6.59 | 1705.6        | 1735.6   | 32.07           | 32.49 | 33.07 | 1705.6        | 1735.6   | 0.79                           | 0.52 | 0.34 |
| 1786.3        | 1816.3   | 8.06   | 7.06  | 6.71 | 1786.3        | 1816.3   | 30.98           | 34.16 | 33.84 | 1786.3        | 1816.3   | 0.70                           | 0.48 | 0.34 |
| 1867.0        | 1897.0   | 8.47   | 7.37  | 6.93 | 1867.0        | 1897.0   | 29.35           | 34.57 | 33.92 | 1867.0        | 1897.0   | 0.61                           | 0.43 | 0.33 |
| 1947.8        | 1977.8   | 8.87   | 7.67  | 7.12 | 1947.8        | 1977.8   | 29.29           | 32.06 | 32.63 | 1947.8        | 1977.8   | 0.62                           | 0.48 | 0.42 |
| 2028.5        | 2058.5   | 9.10   | 7.98  | 7.39 | 2028.5        | 2058.5   | 28.88           | 31.77 | 33.32 | 2028.5        | 2058.5   | 0.53                           | 0.36 | 0.33 |
| 2109.2        | 2139.2   | 9.30   | 8.16  | 7.58 | 2109.2        | 2139.2   | 28.72           | 31.21 | 32.79 | 2109.2        | 2139.2   | 0.44                           | 0.29 | 0.27 |
| 2210.2        | 2240.2   | 9.53   | 8.36  | 7.74 | 2210.2        | 2240.2   | 28.84           | 30.15 | 31.84 | 2210.2        | 2240.2   | 0.38                           | 0.24 | 0.25 |
| 2290.9        | 2320.9   | 9.70   | 8.58  | 8.00 | 2290.9        | 2320.9   | 28.32           | 30.16 | 31.62 | 2290.9        | 2320.9   | 0.37                           | 0.21 | 0.19 |
| 2391.8        | 2421.8   | 9.95   | 8.81  | 8.29 | 2391.8        | 2421.8   | 29.07           | 31.41 | 32.31 | 2391.8        | 2421.8   | 0.33                           | 0.20 | 0.16 |
| 2472.6        | 2502.6   | 10.14  | 8.95  | 8.49 | 2472.6        | 2502.6   | 30.19           | 32.10 | 33.07 | 2472.6        | 2502.6   | 0.35                           | 0.17 | 0.17 |
| 2573.5        | 2603.5   | 10.06  | 9.06  | 8.65 | 2573.5        | 2603.5   | 32.67           | 34.37 | 34.10 | 2573.5        | 2603.5   | 0.41                           | 0.20 | 0.16 |
| 2654.2        | 2684.2   | 10.07  | 9.10  | 8.75 | 2654.2        | 2684.2   | 32.37           | 34.88 | 35.45 | 2654.2        | 2684.2   | 0.45                           | 0.22 | 0.17 |
| 2755.1        | 2785.1   | 10.44  | 9.39  | 9.07 | 2755.1        | 2785.1   | 32.68           | 36.62 | 34.13 | 2755.1        | 2785.1   | 0.48                           | 0.24 | 0.17 |
| 2835.9        | 2865.9   | 10.64  | 9.54  | 9.21 | 2835.9        | 2865.9   | 33.19           | 35.50 | 35.23 | 2835.9        | 2865.9   | 0.45                           | 0.25 | 0.17 |
| 2936.8        | 2966.8   | 10.85  | 9.68  | 9.29 | 2936.8        | 2966.8   | 34.54           | 34.73 | 35.09 | 2936.8        | 2966.8   | 0.48                           | 0.29 | 0.19 |
| 3017.5        | 3047.5   | 10.96  | 9.85  | 9.41 | 3017.5        | 3047.5   | 32.02           | 35.93 | 34.93 | 3017.5        | 3047.5   | 0.48                           | 0.31 | 0.17 |
| 3118.4        | 3148.4   | 11.32  | 10.11 | 9.65 | 3118.4        | 3148.4   | 32.38           | 37.05 | 35.65 | 3118.4        | 3148.4   | 0.51                           | 0.37 | 0.17 |
| 3199.2        | 3229.2   | 11.72  | 10.29 | 9.69 | 3199.2        | 3229.2   | 32.42           | 33.95 | 34.91 | 3199.2        | 3229.2   | 0.40                           | 0.42 | 0.26 |
| 3300.1        | 3330.1   | 12.14  | 10.52 | 9.74 | 3300.1        | 3330.1   | 27.43           | 34.33 | 33.10 | 3300.1        | 3330.1   | 0.26                           | 0.33 | 0.27 |



# Frequency Mixer

# SYM-20DHW+

## Typical Performance Data

| IF (OUT) (MHz) | LO (MHz) | CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1000.1MHz (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)=2000.1MHz (dB) |
|----------------|----------|---|----------------|----------|---|----------------|----------|---|
|                |          | @LO (dBm)   |                |          | @LO (dBm)   |                |          | @LO (dBm)   |
|                |          | +17   |                |          | +17   |                |          | +17   |
| 980.0          | 20.1     | 7.38  | 10.0           | 20.1     | 6.33  | 1800.0         | 200.1    | 8.54  |
| 960.2          | 39.9     | 7.34  | 50.2           | 60.3     | 6.26  | 1759.8         | 240.3    | 8.38  |
| 940.4          | 59.7     | 7.46  | 90.4           | 100.5    | 6.20  | 1719.6         | 280.5    | 8.35  |
| 920.6          | 79.5     | 7.47  | 130.7          | 140.8    | 6.14  | 1679.3         | 320.8    | 8.33  |
| 900.8          | 99.3     | 7.40  | 170.9          | 181.0    | 6.16  | 1639.1         | 361.0    | 8.22  |
| 881.0          | 119.1    | 7.47  | 211.1          | 221.2    | 6.11  | 1598.9         | 401.2    | 8.21  |
| 861.2          | 138.9    | 7.40  | 251.3          | 261.4    | 6.16  | 1558.7         | 441.4    | 8.18  |
| 841.4          | 158.7    | 7.41  | 291.6          | 301.7    | 6.15  | 1518.4         | 481.7    | 8.10  |
| 821.6          | 178.5    | 7.45  | 331.8          | 341.9    | 6.21  | 1478.2         | 521.9    | 8.10  |
| 801.8          | 198.3    | 7.43  | 372.0          | 382.1    | 6.22  | 1438.0         | 562.1    | 8.03  |
| 782.0          | 218.1    | 7.41  | 412.2          | 422.3    | 6.20  | 1397.8         | 602.3    | 7.95  |
| 762.2          | 237.9    | 7.36  | 452.5          | 462.6    | 6.37  | 1357.5         | 642.6    | 7.94  |
| 742.4          | 257.7    | 7.37  | 492.7          | 502.8    | 6.39  | 1317.3         | 682.8    | 7.89  |
| 722.7          | 277.4    | 7.48  | 532.9          | 543.0    | 6.45  | 1277.1         | 723.0    | 7.78  |
| 702.9          | 297.2    | 7.32  | 573.1          | 583.2    | 6.53  | 1236.9         | 763.2    | 7.73  |
| 683.1          | 317.0    | 7.31  | 613.4          | 623.5    | 6.53  | 1196.6         | 803.5    | 7.65  |
| 663.3          | 336.8    | 7.34  | 653.6          | 663.7    | 6.70  | 1156.4         | 843.7    | 7.61  |
| 643.5          | 356.6    | 7.36  | 693.8          | 703.9    | 6.83  | 1116.2         | 883.9    | 7.54  |
| 623.7          | 376.4    | 7.31  | 734.0          | 744.1    | 6.97  | 1076.0         | 924.1    | 7.47  |
| 603.9          | 396.2    | 7.27  | 794.4          | 804.5    | 7.06  | 1015.6         | 984.5    | 7.34  |
| 564.3          | 435.8    | 7.26  | 834.6          | 844.7    | 7.12  | 975.4          | 1024.7   | 7.23  |
| 544.5          | 455.6    | 7.24  | 894.9          | 905.0    | 7.16  | 915.1          | 1085.0   | 7.13  |
| 504.9          | 495.2    | 7.24  | 935.2          | 945.3    | 7.28  | 874.8          | 1125.3   | 7.08  |
| 485.1          | 515.0    | 7.07  | 995.5          | 1005.6   | 7.37  | 814.5          | 1185.6   | 7.02  |
| 445.5          | 554.6    | 7.18  | 1035.7         | 1045.8   | 7.39  | 774.3          | 1225.8   | 7.00  |
| 425.7          | 574.4    | 7.00  | 1096.1         | 1106.2   | 7.43  | 713.9          | 1286.2   | 6.94  |
| 386.1          | 614.0    | 7.07  | 1136.3         | 1146.4   | 7.49  | 673.7          | 1326.4   | 6.97  |
| 366.3          | 633.8    | 6.97  | 1196.6         | 1206.7   | 7.54  | 613.4          | 1386.7   | 6.92  |
| 326.7          | 673.4    | 7.02  | 1236.9         | 1247.0   | 7.60  | 573.1          | 1427.0   | 6.97  |
| 306.9          | 693.2    | 6.98  | 1297.2         | 1307.3   | 7.71  | 512.8          | 1487.3   | 6.95  |
| 267.3          | 732.8    | 6.97  | 1337.4         | 1347.5   | 7.72  | 472.6          | 1527.5   | 7.03  |
| 247.6          | 752.5    | 6.93  | 1397.8         | 1407.9   | 7.83  | 412.2          | 1587.9   | 7.07  |
| 208.0          | 792.1    | 6.88  | 1438.0         | 1448.1   | 7.91  | 372.0          | 1628.1   | 7.15  |
| 188.2          | 811.9    | 6.80  | 1498.3         | 1508.4   | 8.01  | 311.7          | 1688.4   | 7.21  |
| 148.6          | 851.5    | 6.66  | 1538.5         | 1548.6   | 8.09  | 271.5          | 1728.6   | 7.28  |
| 128.8          | 871.3    | 6.67  | 1598.9         | 1609.0   | 8.19  | 211.1          | 1789.0   | 7.38  |
| 89.2           | 910.9    | 6.51  | 1639.1         | 1649.2   | 8.23  | 170.9          | 1829.2   | 7.46  |
| 69.4           | 930.7    | 6.54  | 1699.4         | 1709.5   | 8.34  | 110.6          | 1889.5   | 7.58  |
| 29.8           | 970.3    | 6.46  | 1739.7         | 1749.8   | 8.44  | 70.3           | 1929.8   | 7.65  |
| 10.0           | 990.1    | 6.51  | 1800.0         | 1810.1   | 8.55  | 10.0           | 1990.1   | 7.87  |



# Frequency Mixer

# SYM-20DHW+

## Typical Performance Data

| LO<br>(MHz) | LO-RF ISOLATION<br>(dB) |       |       | LO-IF ISOLATION<br>(dB) |       |       |
|-------------|-------------------------|-------|-------|-------------------------|-------|-------|
|             | @LO (dBm)               |       |       | @LO (dBm)               |       |       |
|             | +14                     | +17   | +20   | +14                     | +17   | +20   |
| 10.1        | 25.42                   | 28.06 | 30.86 | 43.94                   | 47.81 | 52.76 |
| 90.8        | 33.27                   | 36.18 | 39.31 | 45.09                   | 50.12 | 54.78 |
| 171.6       | 34.77                   | 37.95 | 41.31 | 46.74                   | 51.82 | 52.45 |
| 252.3       | 35.41                   | 38.88 | 42.43 | 49.57                   | 51.29 | 47.76 |
| 333.0       | 35.75                   | 39.44 | 43.61 | 54.40                   | 48.91 | 45.20 |
| 413.8       | 36.17                   | 40.16 | 45.21 | 55.67                   | 46.35 | 43.11 |
| 494.5       | 36.92                   | 41.41 | 47.76 | 52.13                   | 44.68 | 41.88 |
| 575.3       | 38.03                   | 43.39 | 52.51 | 48.32                   | 43.11 | 40.86 |
| 656.0       | 38.79                   | 44.64 | 54.79 | 46.12                   | 42.02 | 39.99 |
| 736.7       | 39.07                   | 44.43 | 52.13 | 44.79                   | 41.39 | 39.31 |
| 817.5       | 39.51                   | 44.54 | 48.07 | 44.01                   | 41.20 | 39.16 |
| 898.2       | 39.79                   | 43.43 | 44.28 | 43.12                   | 40.97 | 39.16 |
| 978.9       | 39.49                   | 41.64 | 41.55 | 41.33                   | 39.99 | 38.64 |
| 1059.7      | 38.31                   | 39.64 | 39.47 | 39.53                   | 38.93 | 37.97 |
| 1140.4      | 37.04                   | 38.37 | 38.27 | 38.27                   | 38.14 | 37.42 |
| 1221.1      | 35.96                   | 37.39 | 37.32 | 37.34                   | 37.58 | 37.01 |
| 1301.9      | 34.92                   | 36.74 | 37.03 | 36.85                   | 37.12 | 36.65 |
| 1382.6      | 34.24                   | 36.17 | 36.57 | 36.23                   | 36.54 | 36.17 |
| 1463.4      | 33.96                   | 35.82 | 36.48 | 35.95                   | 36.42 | 36.05 |
| 1544.1      | 33.65                   | 35.48 | 36.35 | 35.08                   | 35.82 | 35.55 |
| 1624.8      | 33.41                   | 35.92 | 36.97 | 34.10                   | 35.30 | 35.43 |
| 1705.6      | 32.66                   | 35.66 | 37.21 | 33.25                   | 34.62 | 35.01 |
| 1786.3      | 31.93                   | 35.05 | 36.92 | 32.57                   | 33.90 | 34.77 |
| 1867.0      | 31.32                   | 34.30 | 36.69 | 31.98                   | 33.09 | 34.03 |
| 1947.8      | 31.06                   | 34.37 | 36.96 | 31.63                   | 32.71 | 33.62 |
| 2028.5      | 30.69                   | 34.01 | 36.64 | 31.33                   | 32.17 | 33.43 |
| 2109.2      | 30.71                   | 33.75 | 36.83 | 31.14                   | 31.68 | 32.68 |
| 2210.2      | 31.27                   | 34.04 | 36.78 | 31.19                   | 31.56 | 32.42 |
| 2290.9      | 32.07                   | 35.25 | 38.16 | 31.25                   | 31.36 | 32.06 |
| 2391.8      | 33.25                   | 36.65 | 39.79 | 31.36                   | 31.86 | 32.55 |
| 2472.6      | 34.62                   | 38.33 | 41.29 | 31.09                   | 31.90 | 32.92 |
| 2573.5      | 36.58                   | 40.42 | 42.43 | 30.78                   | 31.80 | 33.11 |
| 2654.2      | 39.11                   | 42.28 | 41.90 | 30.62                   | 31.82 | 33.32 |
| 2755.1      | 41.08                   | 40.15 | 38.86 | 30.58                   | 31.97 | 33.53 |
| 2835.9      | 40.99                   | 37.90 | 36.80 | 30.38                   | 31.92 | 33.38 |
| 2936.8      | 39.99                   | 36.24 | 34.48 | 30.23                   | 31.76 | 32.99 |
| 3017.5      | 38.52                   | 35.79 | 33.92 | 30.12                   | 31.49 | 32.40 |
| 3118.4      | 36.44                   | 35.16 | 33.70 | 30.21                   | 31.24 | 31.75 |
| 3199.2      | 35.10                   | 34.00 | 32.95 | 30.26                   | 31.03 | 31.18 |
| 3300.1      | 34.58                   | 33.78 | 32.38 | 29.72                   | 30.05 | 29.96 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | RF-IF ISOLATION<br>(dB) |       |       |
|---------------------|-------------|-------------------------|-------|-------|
|                     |             | @LO (dBm)               |       |       |
|                     |             | +14                     | +17   | +20   |
| 10.1                | 40.1        | 35.18                   | 34.34 | 34.28 |
| 90.8                | 120.8       | 35.26                   | 35.31 | 35.21 |
| 171.6               | 201.6       | 36.13                   | 36.09 | 35.89 |
| 252.3               | 282.3       | 37.41                   | 37.25 | 37.50 |
| 333.0               | 363.0       | 38.30                   | 38.87 | 38.90 |
| 413.8               | 443.8       | 40.05                   | 40.90 | 40.64 |
| 494.5               | 524.5       | 43.33                   | 44.62 | 43.80 |
| 575.3               | 605.3       | 47.54                   | 46.82 | 45.59 |
| 656.0               | 686.0       | 52.60                   | 51.53 | 48.64 |
| 736.7               | 766.7       | 50.60                   | 59.14 | 52.46 |
| 817.5               | 847.5       | 46.76                   | 51.95 | 57.49 |
| 898.2               | 928.2       | 43.89                   | 46.09 | 48.30 |
| 978.9               | 1008.9      | 40.92                   | 42.79 | 44.76 |
| 1059.7              | 1089.7      | 39.36                   | 40.97 | 42.16 |
| 1140.4              | 1170.4      | 38.15                   | 39.37 | 40.13 |
| 1221.1              | 1251.1      | 37.43                   | 38.04 | 38.50 |
| 1301.9              | 1331.9      | 37.28                   | 37.64 | 37.77 |
| 1382.6              | 1412.6      | 37.15                   | 37.22 | 37.27 |
| 1463.4              | 1493.4      | 36.53                   | 37.26 | 37.55 |
| 1544.1              | 1574.1      | 35.10                   | 36.39 | 36.90 |
| 1624.8              | 1654.8      | 34.33                   | 35.91 | 36.80 |
| 1705.6              | 1735.6      | 33.67                   | 35.46 | 36.40 |
| 1786.3              | 1816.3      | 33.39                   | 34.98 | 36.12 |
| 1867.0              | 1897.0      | 33.19                   | 34.51 | 35.46 |
| 1947.8              | 1977.8      | 33.03                   | 34.06 | 34.77 |
| 2028.5              | 2058.5      | 33.19                   | 33.64 | 34.04 |
| 2109.2              | 2139.2      | 33.45                   | 33.79 | 33.95 |
| 2210.2              | 2240.2      | 34.62                   | 34.67 | 34.68 |
| 2290.9              | 2320.9      | 36.14                   | 36.11 | 36.17 |
| 2391.8              | 2421.8      | 39.18                   | 38.77 | 38.57 |
| 2472.6              | 2502.6      | 42.00                   | 41.63 | 41.25 |
| 2573.5              | 2603.5      | 45.10                   | 43.80 | 43.16 |
| 2654.2              | 2684.2      | 44.39                   | 42.95 | 41.88 |
| 2755.1              | 2785.1      | 42.09                   | 41.39 | 41.01 |
| 2835.9              | 2865.9      | 39.48                   | 39.11 | 38.50 |
| 2936.8              | 2966.8      | 36.04                   | 35.93 | 35.60 |
| 3017.5              | 3047.5      | 33.83                   | 33.90 | 33.76 |
| 3118.4              | 3148.4      | 31.89                   | 31.64 | 31.63 |
| 3199.2              | 3229.2      | 30.68                   | 30.54 | 30.67 |
| 3300.1              | 3330.1      | 29.01                   | 28.87 | 29.03 |

# Frequency Mixer

# SYM-20DHW+

## Typical Performance Data

| RF (IN)<br>(MHz) | LO<br>(MHz) | RF VSWR<br>(:1) |      |      |
|------------------|-------------|-----------------|------|------|
|                  |             | @LO (dBm)       |      |      |
|                  |             | +14             | +17  | +20  |
| 10.1             | 40.1        | 1.44            | 1.37 | 1.35 |
| 90.8             | 120.8       | 1.34            | 1.19 | 1.09 |
| 171.6            | 201.6       | 1.41            | 1.25 | 1.16 |
| 252.3            | 282.3       | 1.52            | 1.39 | 1.31 |
| 333.0            | 363.0       | 1.72            | 1.58 | 1.48 |
| 413.8            | 443.8       | 1.94            | 1.77 | 1.64 |
| 494.5            | 524.5       | 2.18            | 1.96 | 1.81 |
| 575.3            | 605.3       | 2.41            | 2.15 | 2.00 |
| 656.0            | 686.0       | 2.62            | 2.33 | 2.16 |
| 736.7            | 766.7       | 2.80            | 2.48 | 2.29 |
| 817.5            | 847.5       | 2.78            | 2.48 | 2.30 |
| 898.2            | 928.2       | 2.71            | 2.45 | 2.30 |
| 978.9            | 1008.9      | 2.64            | 2.40 | 2.27 |
| 1059.7           | 1089.7      | 2.49            | 2.27 | 2.15 |
| 1140.4           | 1170.4      | 2.28            | 2.09 | 1.97 |
| 1221.1           | 1251.1      | 2.12            | 1.93 | 1.81 |
| 1301.9           | 1331.9      | 1.99            | 1.79 | 1.68 |
| 1382.6           | 1412.6      | 1.85            | 1.66 | 1.56 |
| 1463.4           | 1493.4      | 1.69            | 1.52 | 1.44 |
| 1544.1           | 1574.1      | 1.54            | 1.40 | 1.35 |
| 1624.8           | 1654.8      | 1.42            | 1.32 | 1.31 |
| 1705.6           | 1735.6      | 1.31            | 1.27 | 1.30 |
| 1786.3           | 1816.3      | 1.18            | 1.23 | 1.31 |
| 1867.0           | 1897.0      | 1.07            | 1.21 | 1.33 |
| 1947.8           | 1977.8      | 1.17            | 1.29 | 1.41 |
| 2028.5           | 2058.5      | 1.37            | 1.45 | 1.53 |
| 2109.2           | 2139.2      | 1.61            | 1.68 | 1.73 |
| 2210.2           | 2240.2      | 2.03            | 2.10 | 2.14 |
| 2290.9           | 2320.9      | 2.48            | 2.55 | 2.59 |
| 2391.8           | 2421.8      | 3.02            | 3.07 | 3.08 |
| 2472.6           | 2502.6      | 3.33            | 3.36 | 3.34 |
| 2573.5           | 2603.5      | 3.78            | 3.78 | 3.74 |
| 2654.2           | 2684.2      | 4.32            | 4.25 | 4.21 |
| 2755.1           | 2785.1      | 4.92            | 4.69 | 4.61 |
| 2835.9           | 2865.9      | 5.04            | 4.69 | 4.54 |
| 2936.8           | 2966.8      | 5.06            | 4.63 | 4.41 |
| 3017.5           | 3047.5      | 5.27            | 4.84 | 4.54 |
| 3118.4           | 3148.4      | 5.75            | 5.17 | 4.82 |
| 3199.2           | 3229.2      | 5.89            | 5.16 | 4.70 |
| 3300.1           | 3330.1      | 5.47            | 4.80 | 4.27 |

| LO<br>(MHz) | LO VSWR<br>(:1) |      |      |
|-------------|-----------------|------|------|
|             | @LO (dBm)       |      |      |
|             | +14             | +17  | +20  |
| 10.1        | 1.32            | 1.63 | 2.26 |
| 90.8        | 1.04            | 1.54 | 2.23 |
| 171.6       | 1.02            | 1.54 | 2.24 |
| 252.3       | 1.03            | 1.54 | 2.26 |
| 333.0       | 1.08            | 1.54 | 2.24 |
| 413.8       | 1.11            | 1.52 | 2.18 |
| 494.5       | 1.12            | 1.48 | 2.10 |
| 575.3       | 1.14            | 1.46 | 2.05 |
| 656.0       | 1.17            | 1.45 | 2.01 |
| 736.7       | 1.15            | 1.43 | 1.99 |
| 817.5       | 1.15            | 1.40 | 1.94 |
| 898.2       | 1.17            | 1.37 | 1.89 |
| 978.9       | 1.20            | 1.35 | 1.85 |
| 1059.7      | 1.25            | 1.35 | 1.82 |
| 1140.4      | 1.30            | 1.35 | 1.81 |
| 1221.1      | 1.33            | 1.36 | 1.79 |
| 1301.9      | 1.35            | 1.34 | 1.76 |
| 1382.6      | 1.38            | 1.33 | 1.73 |
| 1463.4      | 1.43            | 1.34 | 1.73 |
| 1544.1      | 1.49            | 1.37 | 1.74 |
| 1624.8      | 1.53            | 1.40 | 1.74 |
| 1705.6      | 1.55            | 1.43 | 1.74 |
| 1786.3      | 1.57            | 1.45 | 1.74 |
| 1867.0      | 1.60            | 1.47 | 1.74 |
| 1947.8      | 1.64            | 1.48 | 1.73 |
| 2028.5      | 1.67            | 1.49 | 1.73 |
| 2109.2      | 1.71            | 1.48 | 1.69 |
| 2210.2      | 1.75            | 1.45 | 1.61 |
| 2290.9      | 1.77            | 1.42 | 1.52 |
| 2391.8      | 1.81            | 1.39 | 1.41 |
| 2472.6      | 1.84            | 1.38 | 1.33 |
| 2573.5      | 1.89            | 1.39 | 1.24 |
| 2654.2      | 1.89            | 1.38 | 1.17 |
| 2755.1      | 1.88            | 1.37 | 1.10 |
| 2835.9      | 1.84            | 1.36 | 1.07 |
| 2936.8      | 1.76            | 1.34 | 1.11 |
| 3017.5      | 1.70            | 1.33 | 1.17 |
| 3118.4      | 1.62            | 1.35 | 1.27 |
| 3199.2      | 1.58            | 1.39 | 1.36 |
| 3300.1      | 1.55            | 1.47 | 1.48 |

| IF (OUT)<br>(MHz) | IF VSWR<br>@LO=2000.1MHz<br>(:1) |      |      |
|-------------------|----------------------------------|------|------|
|                   | @LO (dBm)                        |      |      |
|                   | +14                              | +17  | +20  |
| 10.0              | 2.39                             | 1.85 | 1.57 |
| 50.2              | 2.30                             | 1.78 | 1.47 |
| 90.4              | 2.35                             | 1.82 | 1.50 |
| 130.7             | 2.29                             | 1.76 | 1.46 |
| 170.9             | 2.23                             | 1.72 | 1.42 |
| 211.1             | 2.21                             | 1.70 | 1.40 |
| 251.3             | 2.15                             | 1.65 | 1.36 |
| 291.6             | 2.09                             | 1.61 | 1.33 |
| 331.8             | 2.01                             | 1.54 | 1.28 |
| 372.0             | 1.94                             | 1.50 | 1.24 |
| 412.2             | 1.83                             | 1.41 | 1.17 |
| 452.5             | 1.77                             | 1.36 | 1.13 |
| 492.7             | 1.67                             | 1.28 | 1.09 |
| 532.9             | 1.57                             | 1.20 | 1.06 |
| 573.1             | 1.53                             | 1.18 | 1.10 |
| 613.4             | 1.42                             | 1.12 | 1.17 |
| 653.6             | 1.39                             | 1.09 | 1.17 |
| 693.8             | 1.33                             | 1.11 | 1.26 |
| 734.0             | 1.23                             | 1.11 | 1.32 |
| 794.4             | 1.19                             | 1.18 | 1.40 |
| 834.6             | 1.11                             | 1.28 | 1.53 |
| 894.9             | 1.11                             | 1.34 | 1.60 |
| 935.2             | 1.11                             | 1.42 | 1.70 |
| 995.5             | 1.14                             | 1.46 | 1.74 |
| 1035.7            | 1.24                             | 1.61 | 1.92 |
| 1096.1            | 1.26                             | 1.63 | 1.93 |
| 1136.3            | 1.33                             | 1.71 | 2.04 |
| 1196.6            | 1.37                             | 1.76 | 2.07 |
| 1236.9            | 1.46                             | 1.87 | 2.21 |
| 1297.2            | 1.47                             | 1.86 | 2.18 |
| 1337.4            | 1.51                             | 1.90 | 2.22 |
| 1397.8            | 1.57                             | 1.95 | 2.26 |
| 1438.0            | 1.60                             | 1.97 | 2.29 |
| 1498.3            | 1.64                             | 2.00 | 2.31 |
| 1538.5            | 1.63                             | 1.97 | 2.26 |
| 1598.9            | 1.69                             | 2.03 | 2.32 |
| 1639.1            | 1.70                             | 2.00 | 2.27 |
| 1699.4            | 1.71                             | 2.00 | 2.26 |
| 1739.7            | 1.70                             | 1.95 | 2.19 |
| 1800.0            | 1.70                             | 1.94 | 2.17 |

## Harmonics Tables

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -      | 13  | 20  | 21  | 28  | 28  | 32  | 28  | 31  | 33  | 59  |
| 1  | -      | 37     | +0  | 47  | 19  | 49  | 41  | 60  | 41  | 44  | 38  | 41  |
| 2  | 86     | 72     | 63  | 62  | 64  | 62  | 61  | 68  | 63  | 62  | 64  | 68  |
| 3  | >100   | 80     | 64  | 82  | 62  | 82  | 66  | 82  | 67  | 81  | 66  | 75  |
| 4  | >100   | >92    | >92 | >92 | >92 | 85  | >92 | >92 | >92 | >92 | 91  | 90  |
| 5  | >100   | >92    | >92 | >92 | >92 | >92 | 90  | >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 | 91  | >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 | 89  | >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: 1000.1 MHz; -1.00 dBm.  
 LO IN: 1030.01 MHz; +17.00 dBm  
 IF OUT: 29.91 MHz; -7.91 dBm

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |      |      |      |      |      |      |      |     |     |    |
|----|--------|--------|------|------|------|------|------|------|------|-----|-----|----|
| 0  | -      | -      | 23   | 30   | 32   | 39   | 40   | 46   | 42   | 45  | 47  | 58 |
| 1  | -      | 37     | +0   | 48   | 19   | 50   | 36   | 57   | 44   | 49  | 46  | 47 |
| 2  | 74     | 65     | 53   | 68   | 55   | 56   | 53   | 59   | 57   | 59  | 60  | 62 |
| 3  | >100   | 61     | 42   | 62   | 40   | 62   | 47   | 63   | 48   | 68  | 51  | 64 |
| 4  | >100   | 68     | 83   | 65   | 83   | 60   | 70   | 67   | 67   | 80  | 72  | 71 |
| 5  | >100   | 91     | 63   | 75   | 62   | 75   | 57   | 74   | 62   | 76  | 65  | 83 |
| 6  | >100   | 85     | 89   | 82   | >102 | 79   | >102 | 71   | 85   | 75  | 84  | 82 |
| 7  | >100   | 97     | 88   | 97   | 81   | 88   | 77   | 85   | 70   | 83  | 73  | 84 |
| 8  | 95     | >102   | >102 | 95   | 100  | 92   | >102 | 88   | >102 | 80  | 98  | 84 |
| 9  | >100   | 97     | >102 | >102 | 101  | >102 | 97   | >102 | 92   | 99  | 84  | 97 |
| 10 | >100   | >102   | >102 | >102 | >102 | >102 | >102 | >102 | >102 | 100 | 102 | 90 |
|    | RF CAL | 0      | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8   | 9   | 10 |

### LO HARMONICS ORDER

Test conditions: RF IN: 1000.1 MHz; 9.00 dBm.  
 LO IN: 1030.01 MHz; +17.00 dBm  
 IF OUT: 29.91 MHz; 2.11 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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 SYM-20DHW+  
 100818  
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