Mixers

- **Low Frequency Mixers**
- **High Frequency Mixers**

GENERAL INFORMATION

Elisra produces a complete line of high performance in numerous frequency ranges from a low of 0.5 – 2000 MHz to a high of 2 – 18 GHz. They are available in either connectorized or drop-in packages. These mixers offer high reliability as a major feature. They are 100% tested and built to most Army, Navy and Air Force military specifications (MIL-E-5400, Class II and MIL-E-16400).

DEFINITION

Single Sideband Conversion Loss (LC)

Normally referred to as a conversion loss, the single sideband conversion loss of a mixer is the ratio expressed in dB between the RF single input power to a mixer and the output power contained in the desired IF sideband.

Single Sideband Noise Figure (SSBNF)

The single sideband noise figure of a mixer is usually associated with its characteristics system loss (conversion loss) and may usually be treated much the same as an attenuation pad of value Lc in the signal path.

1 dB Compression Point (1 dB Comp PT)

The 1 dB compression point of a mixer refers to an RF input overload level sufficiently large to cause a 1 dB increase in conversion loss compared to the small signal (linear) conversion loss case.

RF Port to IF Port Signal Isolation (L-I Iso)

The L-I port isolation is the ratio in dB between the L frequency power level incident at the L port of the mixer and the L frequency power emanating from the IF (I) port. (L-I feed through).

RF Port to IF Port Signal Isolation (R-I Iso)

The R-I port isolation is the power ratio in dB between the R frequency power level incident at the R port of the mixer and the R frequency power emanating from the IF (I) port. (R-I feed through).

L Port to R Port Signal Isolation (L-R Iso)

The L to R port isolation is the ratio in dB between the L frequency power level incident at the L port of the mixer and the L frequency power emanating from the R port. (L-R feed through).

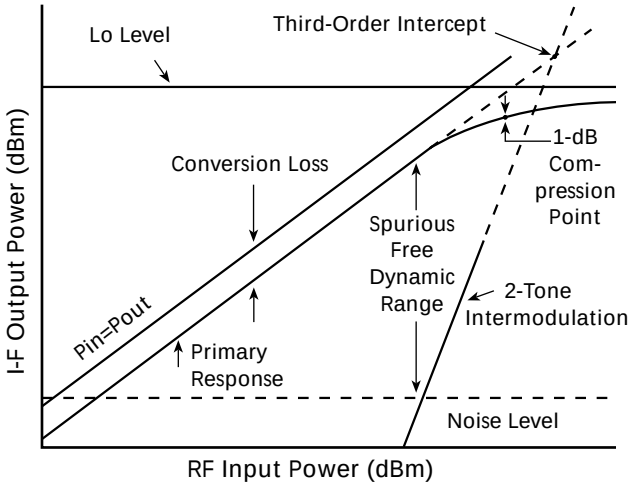


Figure 1. Intercept Diagram

Return Loss – Voltage Standing Wave Ratio (VSWR)

The return loss of a mixer port in dB is a measure of the difference between the incident (applied) power in dBm and the power reflected back toward the power source.

Input Intercept Point (IP)

The point on the input power coordinate at which the fundamental response and the third order spurious response curve intercept. It is often used to predict the 2-tone, 3rd -order suppression of a mixer. The higher the intercept point, the better the 3rd-order suppression. Relative to the input, the intercept point is typically 9 to 11 dB higher than the compression point.

Drive Level (DL)

Drive level is the power level of the local oscillator signal applied to the LO port of a mixer. Operating a mixer with the maximum recommended LO drive level will result in the best 2-tone performance, lowest conversion loss and flattest conversion loss versus frequency characteristics. A reduced LO drive level may help reduce mixer-generated intermodulation products and minimize 1/F noise in the output signal. A higher than recommended LO power level will result in an increased noise figure and higher LO feedthrough at both the RF and IF ports of the mixer (refer to Table 3).

Intermodulation Suppression

Typical harmonic intermodulation for mixer generated harmonics of the input signals are shown in Tables 1 and 2. Suppression numbers are for an FRF signal level at –10 dBm and FLO signal level of +7 dBm.

HOW TO ORDER

When placing your order, please follow the example below.

Example:

$$\frac{\text{MW 14186}}{1} - \frac{\text{M}}{2} - \frac{8}{3}$$

LEGEND

1 – Basic Model Number

2 – Drive Level Suffix

3 – Case Number

INTERMODULATION SUPPRESSION

TABLE 1. High Frequency Mixers*

FRF Harmonics \ FLO Harmonics	1	2	3	4	5
1	0	25	18	40	35
2	40	40	50	55	55
3	65	>70	65	>70	65
4	>70	>70	>70	>70	>70

TABLE 2. Low Frequency Mixers*

FRF Harmonics \ FLO Harmonics	1	2	3	4	5
1	-	25	10	30	30
2	40	45	50	55	55
3	63	70	69	>70	64
4	>70	>70	>70	>70	>70
5	>70	>70	>70	>70	>70

* Relative to desired IF output.

TABLE 3. Mixer Drive Level Characterestics

Local Drive Level	Drive Level Suffix	Local Drive Level Range (dBm)	Typical 1 dB Compression Point (dBm)	Typical Input Intercept Point per min LO Drive (dBm)
Low Drive	L	+10 to +13	+4	+14
Medium Drive	M	+13 to +15	+8	+17
High Drive	H	+17 to +19	+11	+20
Super High Drive	S	+20 to +23	+16	+25

SPECIFICATIONS

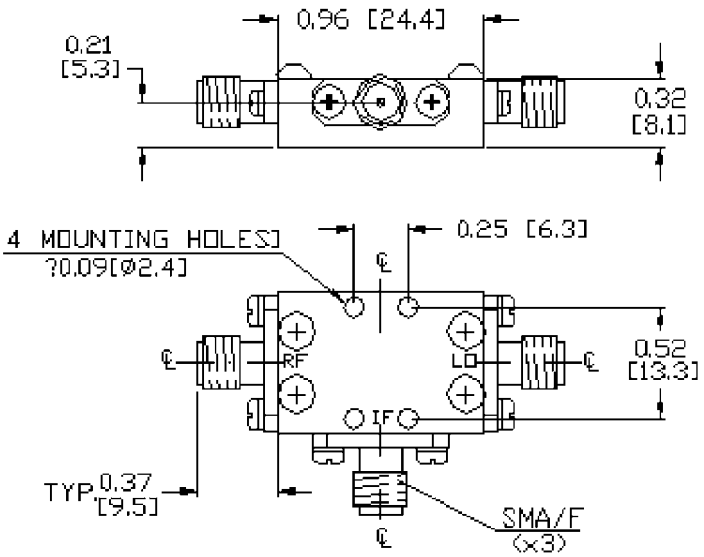
Standard Mixers

Model Number	Drive Level Suffix	Operating Frequency		Coversion Loss		Isolation				VSWR (typ)			Case
						L to I		L to R					
		FR&FL (GHz)	FI (MHz)	Typ (dB)	Max (dB)	Typ (dB)	Max (dB)	Typ (dB)	Max (dB)	R Port	L Port	I Port	
MMW 14158	L M	0.05÷2	DC÷500	8	10.5	20	17	25	20	2.5:1	2.5:1	2.5:1	7, 8
MW 14064	L M H,S	2÷6	5÷2000	7 7 7	10 10 11	25	15	25	15	2.5:1	2.5:1	2.5:1	7, 8
MW 141611	L M H,S	2÷16	5÷2000	6 7 8	10 10 11	25	15	25	15	2.5:1	2.5:1	2.5:1	7, 8
MW 14181	L M H,S	4÷18	5÷2000	6.5 7.5 8	10 10 11	25	15	25	15	2.5:1	2.5:1	2.5:1	7, 8
MW141846	L M H,S	4÷18	2000	7.5 8.5 9	10 10 11	30	15	30	15	2.5:1	2.5:1	2.5:1	7, 8
MW 14185	L M H,S	5÷18	5÷6000	7 8 8	11 11 11	30	15	30	15	2.5:1	2.5:1	2.5:1	7, 8
MW1418204	L M H,S	2÷18	5÷4000	7 8 9	11 11 11	30	15	30	15	2.5:1	2.5:1	2.5:1	7, 8
MW 1418216	L M H,S	2÷18	2000 TO 6000	6 7 7	10 10 11	30	15	30	15	2.5:1	2.5:1	2.5:1	7, 8
MW 1418218	L M H,S	2÷18	2000 TO 8000	7 7 8	11 11 11	30	15	30	15	2.5:1	2.5:1	2.5:1	7, 8
MW 14208	L M	2÷ 20	2000 TO 8000	8 9	11 11	30	15	30	15	2.5:1	2.5:1	2.5:1	7, 8

Outline Drawings

All dimensions are in inches and (mm). Drawings are in first angle projection.

CASE 7



CASE 8