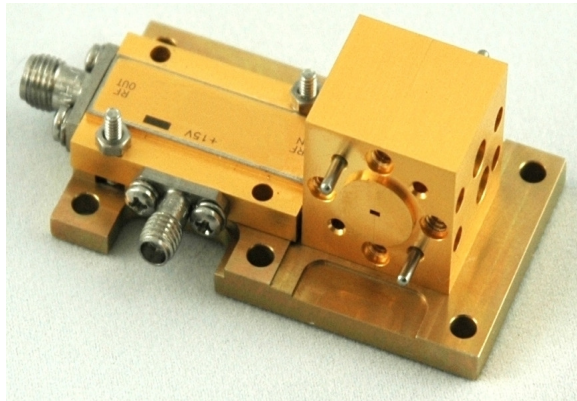


## SERIES MSH SUBHARMONIC MIXERS



### DESCRIPTION

Millitech series MSH subharmonic mixers operate at second harmonic of the local oscillator frequency. Hence, the local oscillator frequency is one-half of the RF in the applicable waveguide band. These mixers offer the advantage of a lower frequency local oscillator while achieving noise figure typically between 5 and 9 dB.

The MSH subharmonic mixers have been optimized to operate at a fixed LO frequency and provide a broad IF frequency coverage, using an SMA-F connector. The LO and RF ports use waveguide flanges.

A band-pass filter is included in the LO waveguide to clean up harmonic signals that could be present in the LO. Also, a notch filter is present in the RF waveguide to reflect the 3<sup>rd</sup> harmonic of the LO back into the mixer at an optimum phase for the best mixer conversion efficiency.

This series also comes with an integrated IF amplifier. Gain of the amplification stage may be chosen while ordering. To power the amplifier, the MSH has a SMA-F power connector.

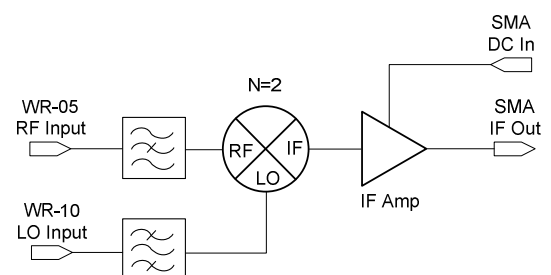
### FEATURES:

- DSB NF 5.5dB typ. @ 166GHz
- DSB NF 7.0dB typ. @ 183GHz
- Second harmonic operation
- 5-6dBm LO drive power
- Integrated IF Amplifier

### APPLICATIONS:

- Heterodyne radiometer
- Frequency extension to 193GHz
- Automated test equipment
- Instrumentation

### DIAGRAM



**ELECTRICAL SPECIFICATIONS (STANDARD PRODUCTS)\*1,4**

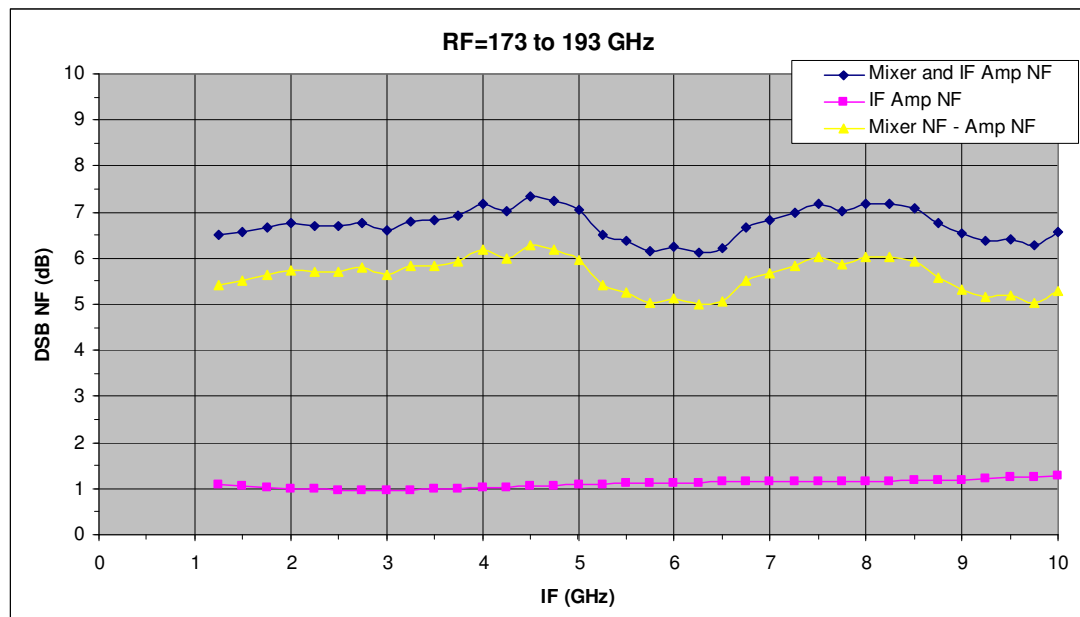
Model Number	RF frequency range (GHz)	LO frequency (GHz)	Harmonic number	Noise Figure (dB) (typ) *2	IF frequency range (GHz)	LO power level (optimum)	LO wave-guide
<b>MSH-08-102</b>	92-112	51*3	2	8.0	0.5-10.0	6 dBm	WR-15
<b>MSH-08-118</b>	108-128	59*3	2	8.0	0.5-10.0	6 dBm	WR-15
<b>MSH-06-134</b>	124-144	67*3	2	8.0	0.5-10.0	6 dBm	WR-12
<b>MSH-06-150</b>	140-160	75*3	2	8.0	0.5-10.0	6 dBm	WR-12
<b>MSH-05-166</b>	162-170	83	2	5.5	0.1-4.0	5 dBm	WR-10
<b>MSH-05-183</b>	173-193	91.5	2	7.0	0.5-10.0	6 dBm	WR-10
<b>MSH-04-250</b>	240-260	125	2	9.0	0.5-10.0	6 dBm	WR-08

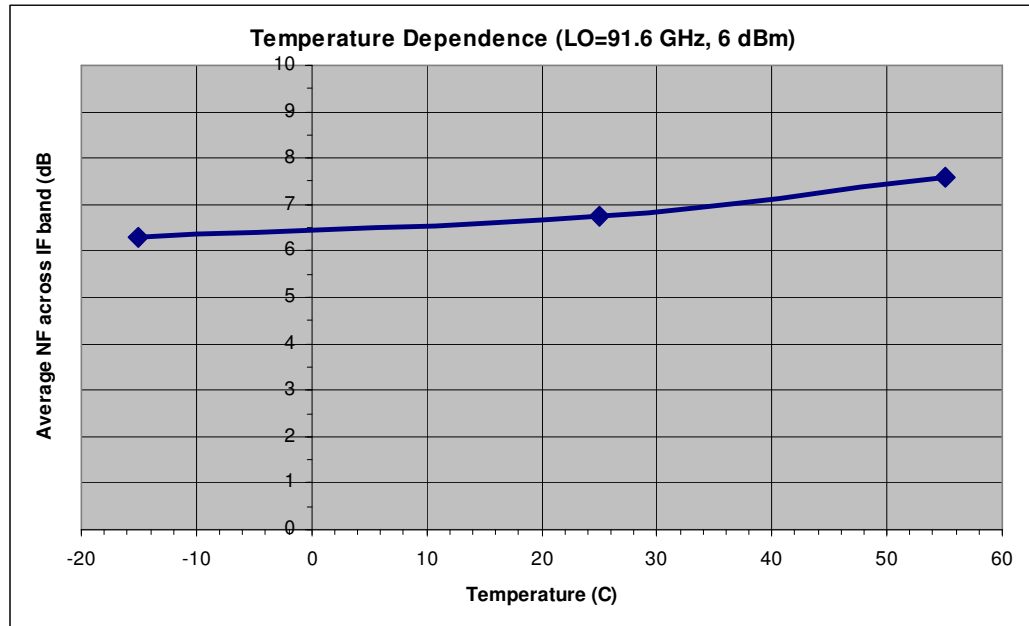
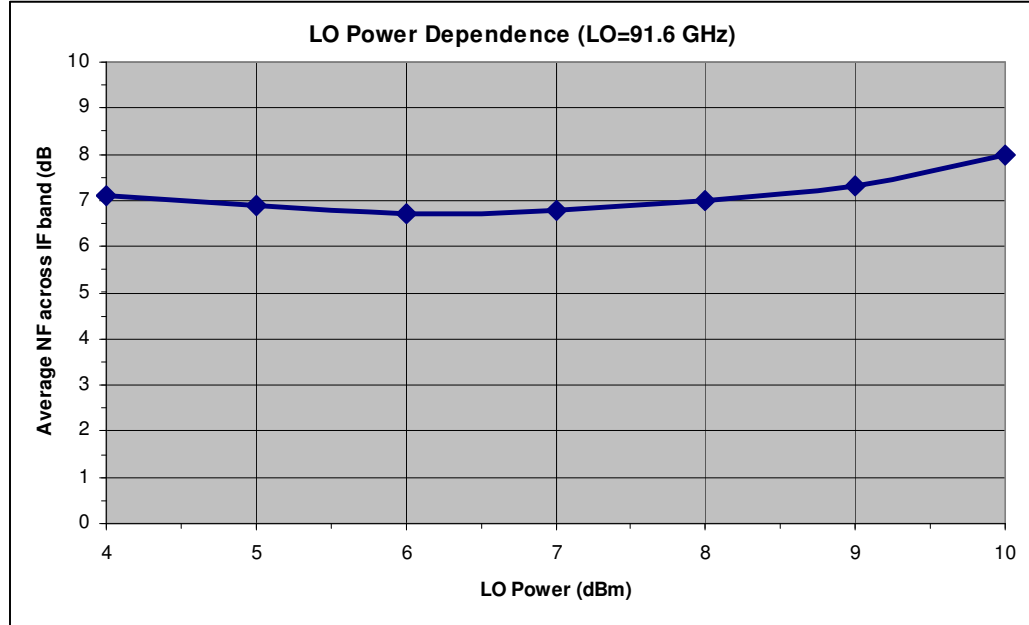
\*1 - Custom products available for other operating parameters and options. Please contact Millitech for details.

\*2 - Noise figure is measured double side-band with IF amplifier included.

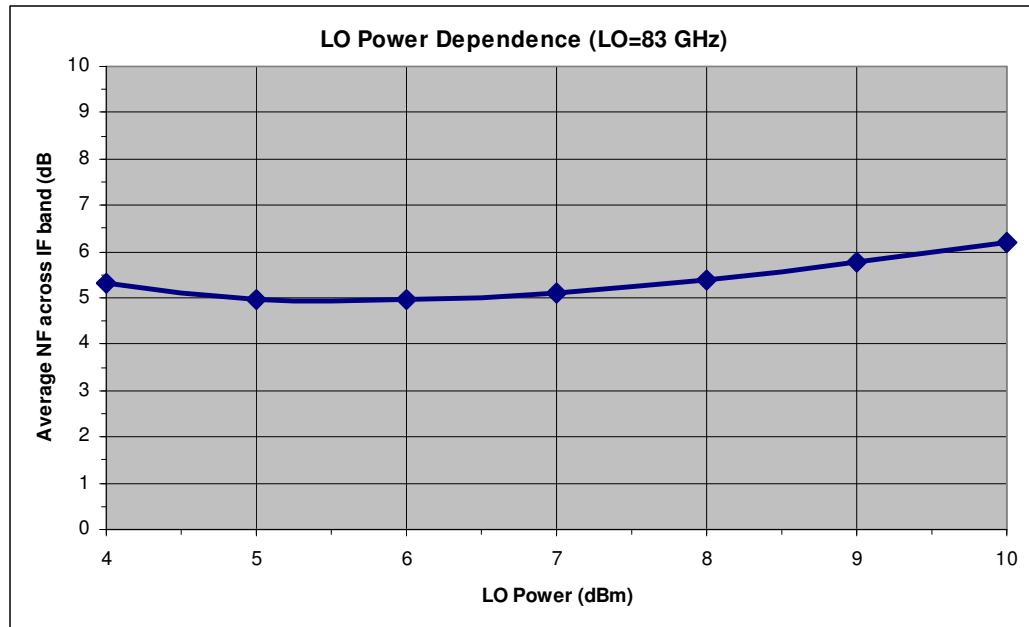
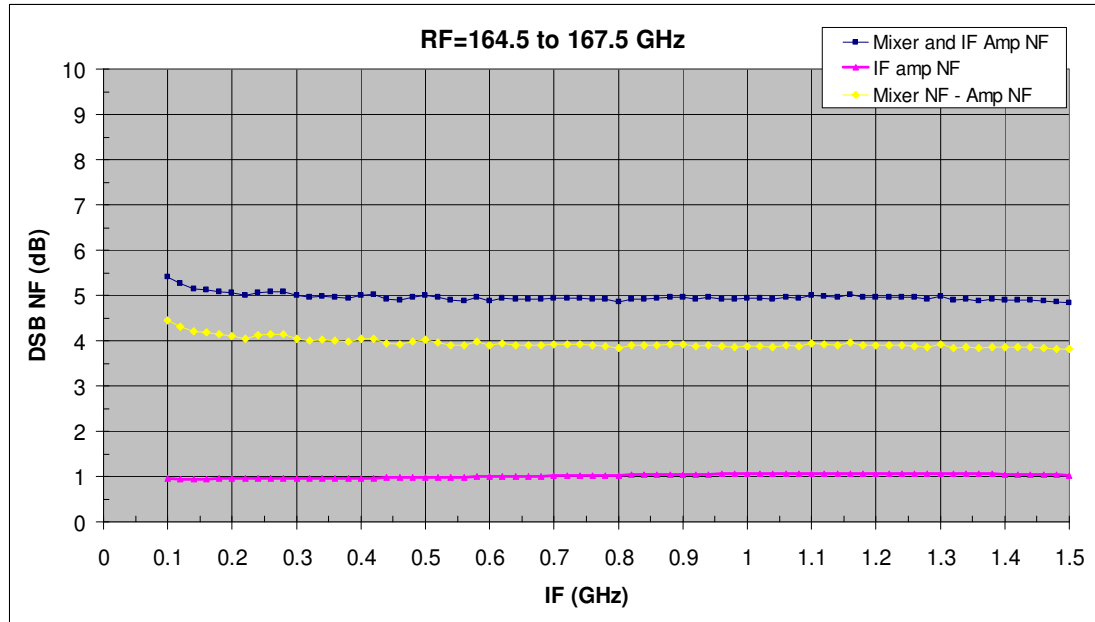
\*3 - LO can be tuned at Millitech to +/- 5% from this value. RF will adjust accordingly.

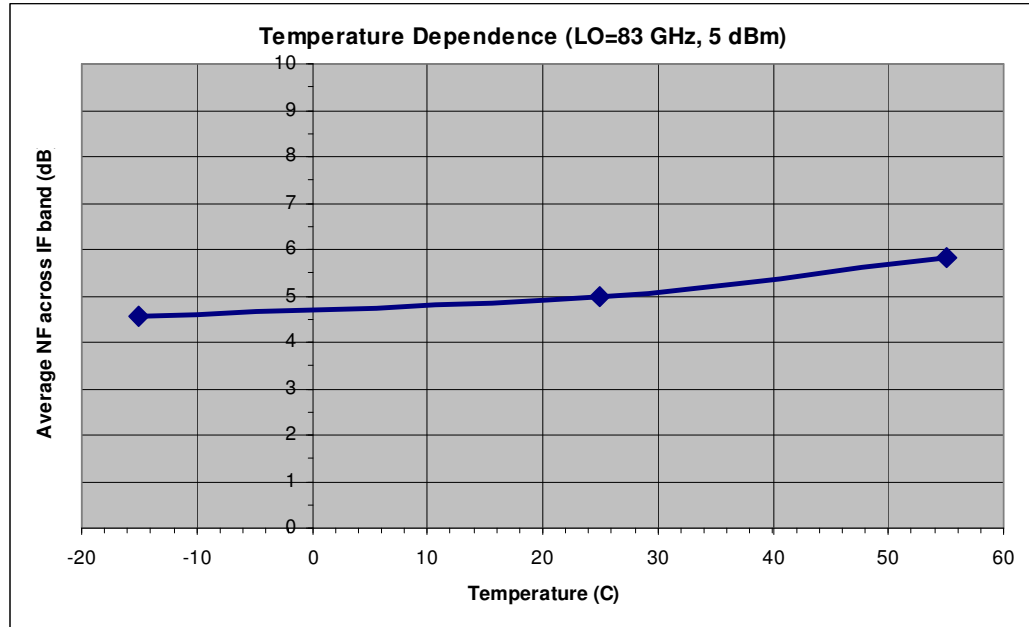
\*4 - The DC input (typical) for all models is 0.1A @ 15V

**TYPICAL PERFORMANCE**
**MSH-05-183 NOISE FIGURE**




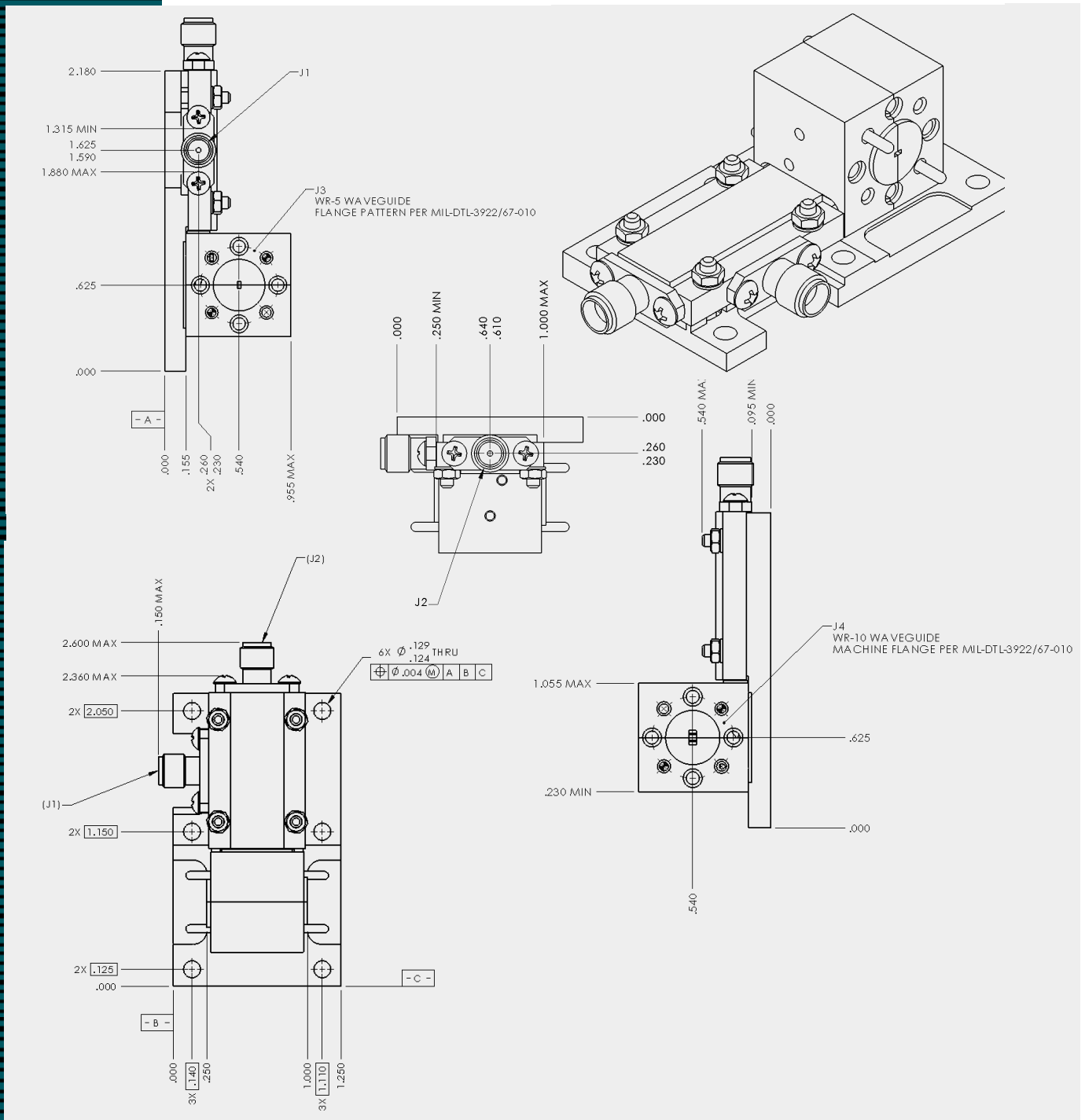
### MSH-05-166 NOISE FIGURE





OUTLINE DRAWING

FIGURE 1



## HOW TO ORDER

**Specify Model Number\***  
**MSH-XX-AAAØ**

**XX** = RF waveguide size  
**See table above (Electrical Specifications)**

**AAA** = Model Selection  
**See table above (Electrical Specifications)**

**Ø** = Special Options  
**N** – nonstandard (specify requirements)

**\* Please specify RF and IF frequency ranges, as well as amplifier gain**