

- 10MHz Input, 100MHz Output ($\pm 1\%$)
- -174 dBc/Hz Additive Phase Noise
- Regulated DC Supply: 6.5V_{DC} to 11.5V_{DC}
- Shielded Housing for COTS / OEM



SUMMARY

The Holzworth HX4110 10x Frequency Multiplier is an accessory for the Holzworth RF Synthesizer products for converting an external reference signal of 10MHz to the 100MHz required by Holzworth RF sources. An emphasis was placed on maintaining the low jitter and phase noise of an external source for precise system timing and low noise performance.

The HX4110 Frequency Multiplier is a laboratory grade reference multiplier that can be used for any reference requirement having a 10MHz to 100MHz conversion. The HX4110 is unique in demonstrating unsurpassed phase noise performance. Holzworth products are 100% final performance tested for phase noise verification¹.

SPECIFICATIONS²

PARAMETER	MIN	TYP	MAX	UNITS	COMMENTS
Input Frequency	9.9	10	10.1	MHz	50 ohms
Output Frequency	99	100	101	MHz	50 ohms
Input Power	2	5	8	dBm	Refer to Figure 3
Output Power	1	8.5	10	dBm	Refer to Figure 3
Output Power Variation		± 3		dB	Unit-to-Unit performance may vary
Phase Noise (Additive)					
Input Referred, 1kHz Offset		-169		dBc/Hz	Refer to Figure 1
Input Referred, 10kHz Offset		-174		dBc/Hz	Refer to Figure 1
Output Referred, 1kHz Offset		-149		dBc/Hz	Refer to Figure 1
Output Referred, 10kHz Offset		-154		dBc/Hz	Refer to Figure 1
Output Harmonics					
2 nd Harmonic		-45	-40	dBc	Refer to Figure 2
3 rd / 4 th Harmonics		-55	-50	dBc	Refer to Figure 2
DC Supply	6.5		11.5	V _{DC}	140mA maximum (refer to figure 5)
RF Connectors	SMA Female				
DC Connectors	SMB Male				
Housing Dimensions (LxWxH)	1.75" x 1.5" x 0.5" (44.5mm x 38.1mm x 12.7mm)				

¹ Final performance verification at RF_{INPUT}= 10MHz / +6dBm, RF_{OUTPUT}= 100MHz, additive (residual) test setup

² Specifications are subject to change per the discretion of Holzworth Instrumentation, Inc.

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HX4110 PHASE NOISE PERFORMANCE DATA

The data provided here displays the typical additive (residual) phase noise performance of the HX4110 10x Frequency Multiplier as measured under ambient laboratory conditions. Figure 1 contains both Output Referred and Input Referred additive phase noise measurements, matching the $20\log(N)$ theoretical difference.

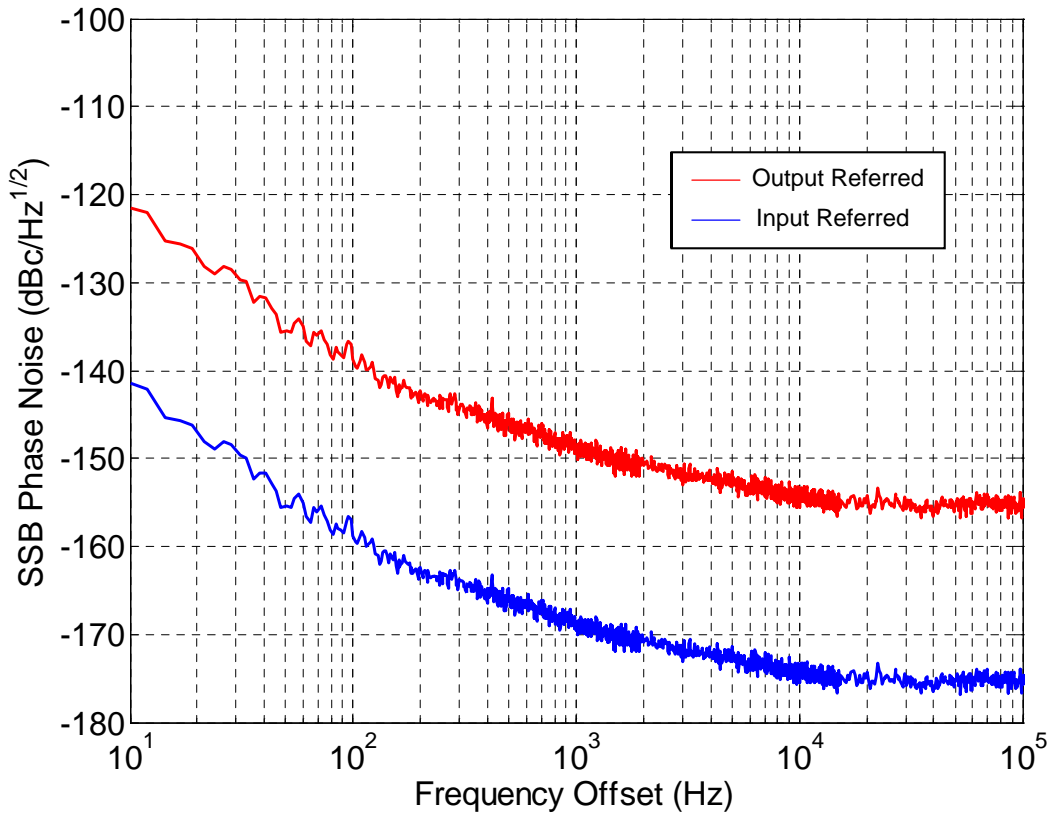


Figure 1: HX4110 Additive Phase Noise
(Test Conditions: $R_{F_{IN}}= 10\text{MHz}$, $P_{IN}= 6\text{dBm}$, $V_{DC}= 7.5$, $R_{F_{OUT}}= 100\text{MHz}$)

HX4110 AUXILIARY PERFORMANCE DATA

This section contains key performance data for the HX4110. Figure 2 demonstrates typical spurious performance, non-corrected with P_{OUT} equal to +9.3dBm. Figure 3 shows the typical relationship between the output and input power levels. Figure 4 shows the output power variation plotted over frequency. Figure 5 shows the typical power dissipation, based on the input power level.

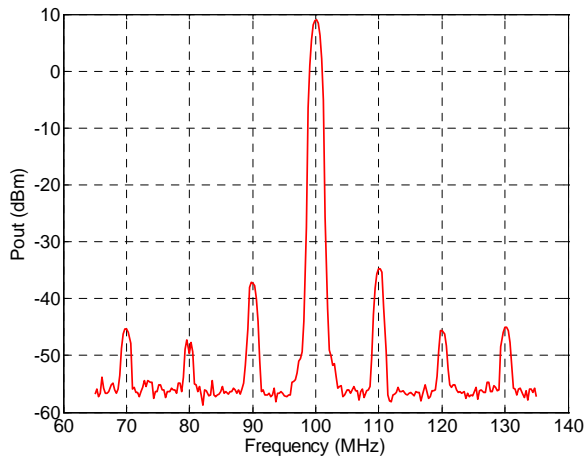


Figure 2: Output Harmonic Performance
($RF_{IN}= 10\text{MHz}$, $P_{IN}= 6\text{dBm}$, $V_{DC}= 7.5$)

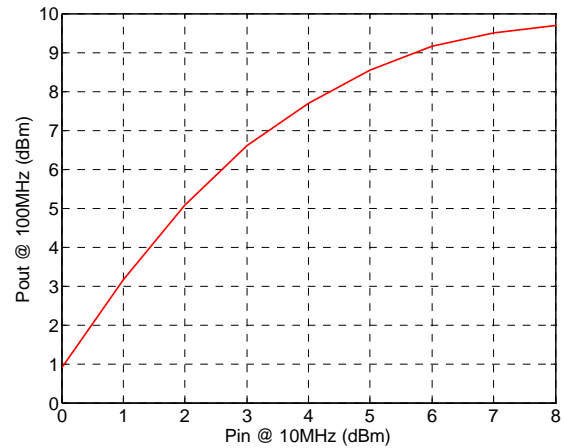


Figure 3: P_{OUT} vs. P_{IN}
($RF_{IN}= 10\text{MHz}$, $V_{DC}= 7.5$)

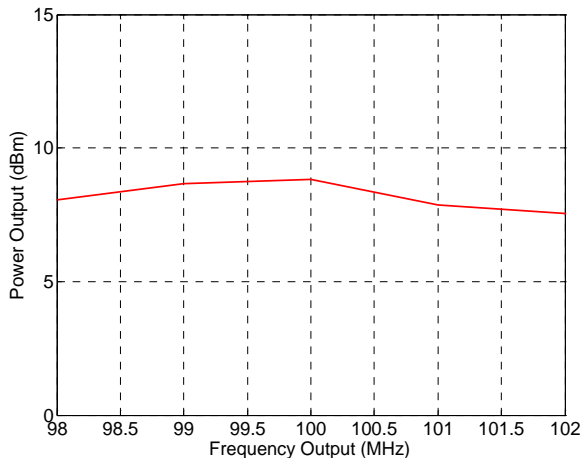


Figure 4: P_{OUT} vs. Frequency Output
($RF_{IN}= 10\text{MHz}$, $P_{IN}= 6\text{dBm}$, $V_{DC}= 7.5$)

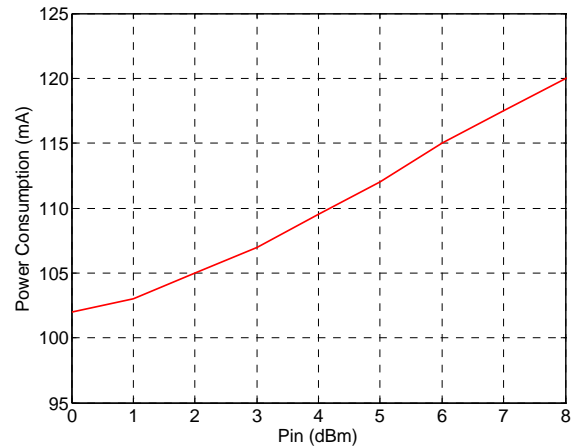
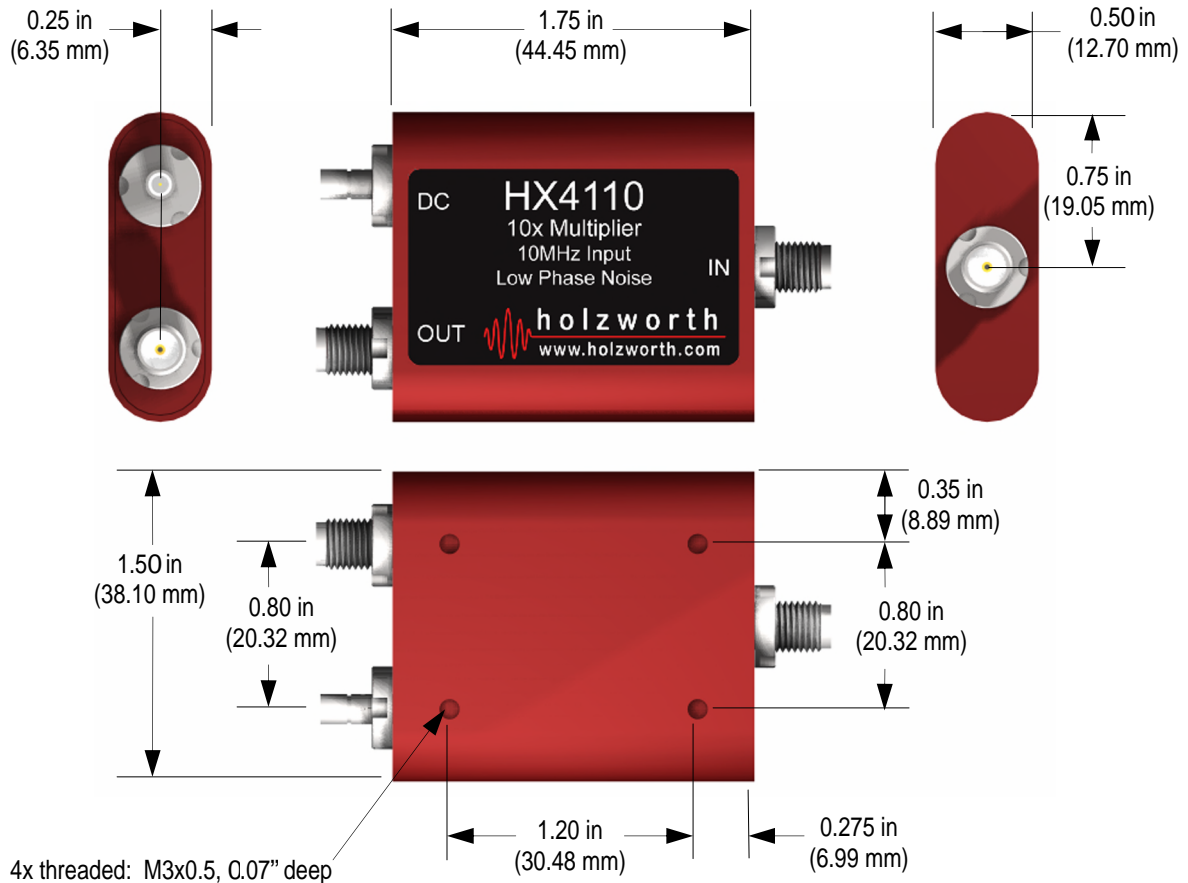


Figure 5: Power Consumption vs. P_{IN}
($RF_{IN}= 10\text{MHz}$, $V_{DC}= 7.5$)

MECHANICAL

The HX4110 comes in a compact, shielded housing complete with threaded mounting holes for ease of system integration into various test sets and COTS/OEM applications.



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WARRANTY

All Holzworth frequency multipliers come with a 90 day 100% product warranty covering manufacturing defects. All product repairs and maintenance must be performed by Holzworth Instrumentation. Holzworth reserves the right to invalidate the warranty for any product that has been tampered with or used improperly. Refer to Holzworth Terms & Conditions of Sales for more details.