

Holzworth RF Synthesizers are broadband, CW sources currently available with frequencies spanning to beyond 3GHz.

Exhibiting industry leading phase noise and spectral purity performance, these synthesizers have proven their reliability in worldwide test and OEM applications since 2004.



Combining precision reference performance, programmable sweep functions, and modulation modes; these compact/rugged sources are ideal solutions for endless applications. Holzworth synthesizers are designed to have the best performance-to-price advantage in their class.



- **ULTRA LOW PHASE NOISE (-151dBc/Hz)**
- **Fine tuning resolution (0.001Hz, 0.1dB, 0.1°)**
- **Fully PHASE COHERENT channel-channel**
- **Java™, LabVIEW™, MATLAB™, etc. control**
- **Compact, rugged form factors (6" x 4" x 1")**
- **Multi-channel size: 1U high, 19" rack mount**
- **CE and RoHS compliant designs**

## RF Synthesizer Products Summary

MODEL	Number of Channels	Bandwidth	Output Power	Phase Noise (10kHz Offset)	Harmonic Output	Spurious Output
HS0301A	1	8MHz to 300MHz	-110dBm to +15dBm	-141 dBc/Hz at 300MHz	-40	-70
HS0304A	4					
HS0308A	8					
HS1001C	1	8MHz to 1GHz	-110dBm to +15dBm	-131 dBc/Hz at 1GHz	-40	-70
HS1004A	4					
HS1008A	8					
HS2001A	1	8MHz to 2GHz	-110dBm to +12dBm	-125 dBc/Hz at 2GHz	-40	-70
HS2004A	4					
HS2008A	8					
HS3001A	1	8MHz to 3GHz	-110dBm to +12dBm	-121 dBc/Hz at 3GHz	-40	-70
HS3004A	4					
HS3008A	8					

Refer to individual product specifications at [www.holzworth.com](http://www.holzworth.com) for complete details

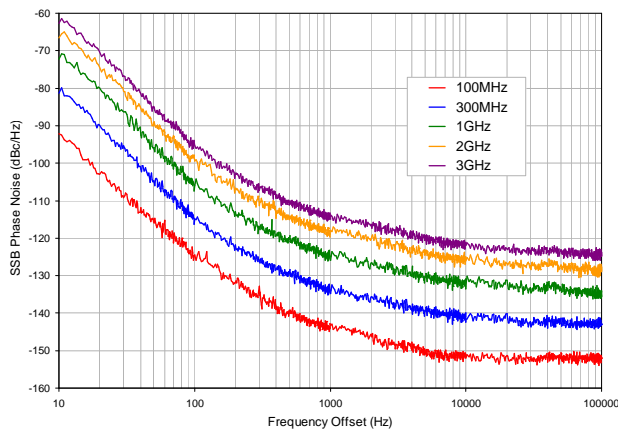
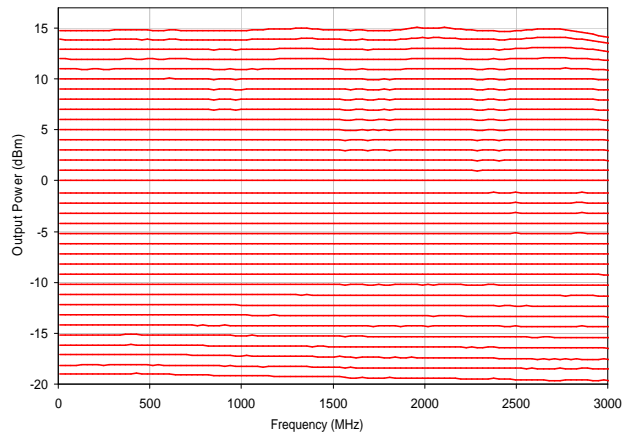
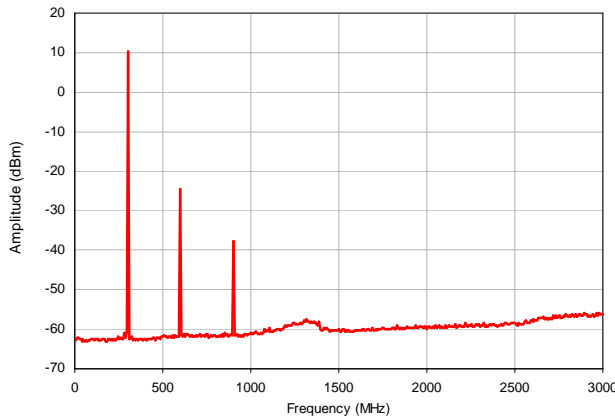
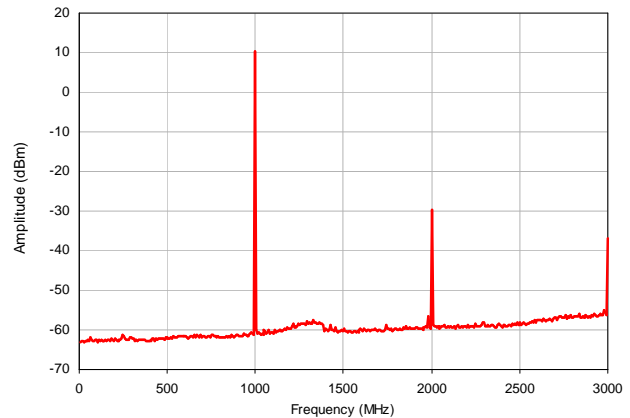
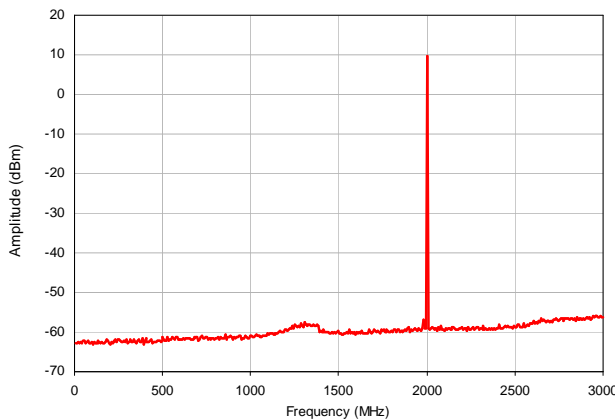
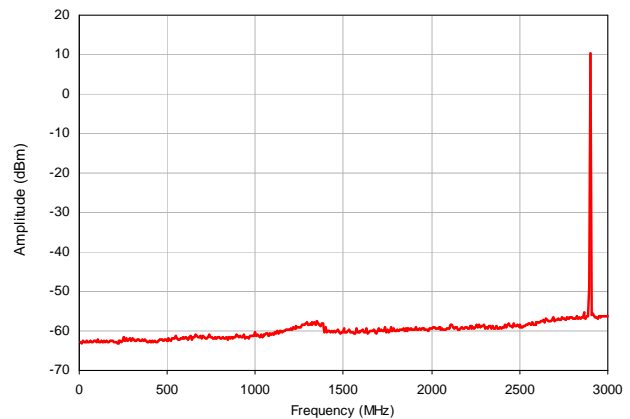
**RF Synthesizer Specification Summary**

The specifications summarized here apply to the full Holzworth RF synthesizer product line, limited only by the upper RF frequency limit of an individual product. Parameters are fully verified at final performance test and 100% guaranteed for the 2 year warranty period of the product.

PARAMETER	MIN	TYP	MAX	UNITS	COMMENTS
Available RF Output Bandwidth	8 M		3.2 G	Hz	MAX: 300MHz, 1GHz, 2GHz & 3GHz (50 ohms output impedance)
RF Output Frequency Resolution		0.001		Hz	
Output Power Range 8 MHz to 1 GHz 1 GHz to 3 GHz	- 110 - 110		+ 15 + 12	dBm dBm	+15dBm available to 3GHz (not guaranteed)
Output Power Resolution		0.1		dB	
Output Power Accuracy		±0.25	±1.0	dB	+10dBm. Refer to data in Figure 2
Output Phase Offset Range	0		360	deg	
Output Phase Offset Resolution Below 1GHz 1GHz to 2GHz 2GHz to 3GHz		0.1 0.2 0.4		deg deg deg	
Tuning Speed		1.0		ms	USB Limited. Inquire for faster tuning speed
Settling Time			100	µs	
Phase Noise <sup>1</sup> 100MHz, 10kHz offset 300MHz, 10kHz offset 1GHz, 10kHz offset 2GHz, 10kHz offset 3GHz, 10kHz offset		-151 -141 -131 -125 -121		dBc/Hz dBc/Hz dBc/Hz dBc/Hz dBc/Hz	Refer to data in Figure 1 Refer to data in Figure 1 Refer to data in Figure 1 Refer to data in Figure 1 Refer to data in Figure 1
Output Spurious Signals		-70	-60	dBc	Refer to data in Figures 3 - 6
Output Harmonics		-40	- 30	dBc	+8dBm, >50MHz. See data in Figures 3 - 6
Output Sub-Harmonics		-70	-60	dBc	Refer to data in Figures 3 - 6
Modulation (DC Coupled) Rate Frequency Deviation Amplitude Modulation Depth Phase Deviation	DC 1 5 1		40k 40k 95 180	Hz Hz % degrees	10kohm input impedance ±1V Input (10kohm) Linear, 0 to 1V Input (10kohm) ±1V Input (10kohm)
Pulse Modulation Threshold Voltage On/Off Ratio Repetition Frequency Pulse Width T <sub>r</sub> /T <sub>f</sub>	DC 200	1.65 -90 100	-70 1 M	V dBc Hz ns ns	3.3V/5V CMOS / TTL Compatible For POUT> -20dBm
Operating Temperature Range	0		35	C	
Initial Reference Accuracy			100	ppb	Within 1 <sup>st</sup> month of operation
Reference Aging		50		ppb/mo	
Reference Frequency Input/Output		100		MHz	10MHz option available
Reference Input Level	+3	4	+5	dBm	
Reference Output Level	+3	4	+5	dBm	
Reference Input/Output Impedance		50		ohms	
Reverse Power Protection			+15	dBm	

**RF Synthesizer Data Summary**

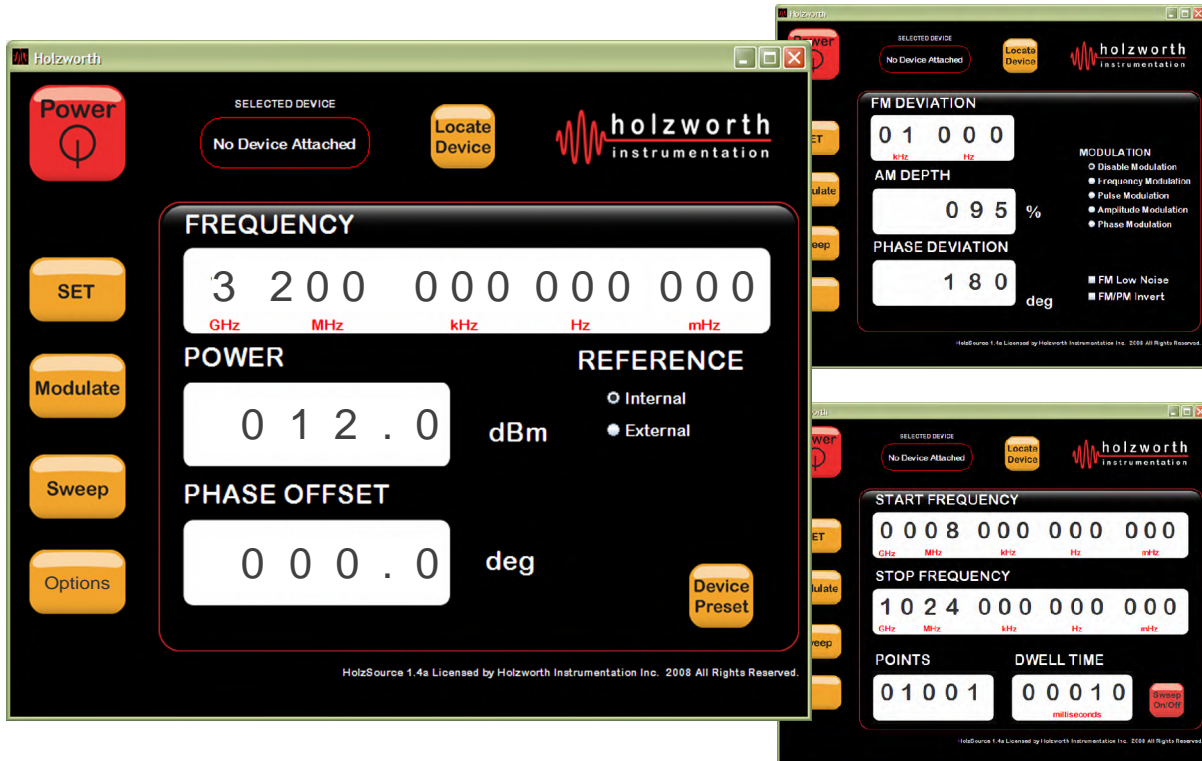
All product models have similar typical and min/max specified performance, limited to the maximum RF frequency limit of a model number. Figure 1 demonstrates typical phase noise performance at key product line frequencies. Figure 2 shows output power flatness over a range of -20dBm to +15dBm. Figures 3 through 6 display typical spectral purity performance at key frequencies.


**Figure 1: SSB Phase Noise ( $P_{OUT} = +12\text{dBm}$ )**

**Figure 2: Output Power Flatness vs. Frequency**

**Figure 3: Spectral Data at 300MHz ( $P_{OUT} = +10\text{dBm}$ )**

**Figure 4: Spectral Data at 1GHz ( $P_{OUT} = +10\text{dBm}$ )**

**Figure 5: Spectral Data at 2GHz ( $P_{OUT} = +10\text{dBm}$ )**

**Figure 6: Spectral Data at 2.9GHz ( $P_{OUT} = +10\text{dBm}$ )**

## Application Software

A proprietary application GUI is available for all Holzworth RF synthesizers. Due to the highly intuitive design of the application software, first time users consistently report no need to ever refer to the product manual.

The Holzworth single channel GUI is shown here.



The provided application GUI is Java™ based as it is an extremely robust platform and accepted as an industry standard. Operating on a minimal amount of memory (<1.0MB for single channel products), users can run the application directly from a USB memory stick, if need be.

DLL access is also provided for “VISA”, LabVIEW™, MATLAB™, etc. control over the instrument.

## Reliable Virtual Instrumentation

The majority of laboratory test systems utilize PCs for data capture and compilation, providing an opportunity to take advantage of the PC for instrument control. Without sacrificing product performance, the user gains valuable bench top, rack or test system real estate.

Holzworth Synthesizers utilize the USB HID (Human Interface Device) transfer protocol. The HID protocol requires no hardware driver installation while providing the absolute highest level of stability.