The new LO generation for PM1 Receiver Box Using Holzworth HSM12001B Synthesize

1. HSM12001B Synthesizer and RF Componets

The Holzworth HSM Series RF Synthesizer Module is a stand alone, CW source. This high frequency source is designed for ease of system integration where Local Oscillator performance is critical.
The core architecture of the HSM Series modules is derived from Holzworth's proprietary NON-PLL design to provide the ultimate in phase / frequency stability. It is a direct-digital/direct-analog hybrid sythesizer.
The HSM12001B Synthesizer model has an extended frequency option of a frequency range from 10MHz to 12.5 GHz with a phase noise performance -110dBc/Hz at 12 GHz (10kHz offset). The versatile HSM Series Synthesizer Module can be controlled directly via the SPI bus. This helps us to program the device locally and command the synthesizer remotely.

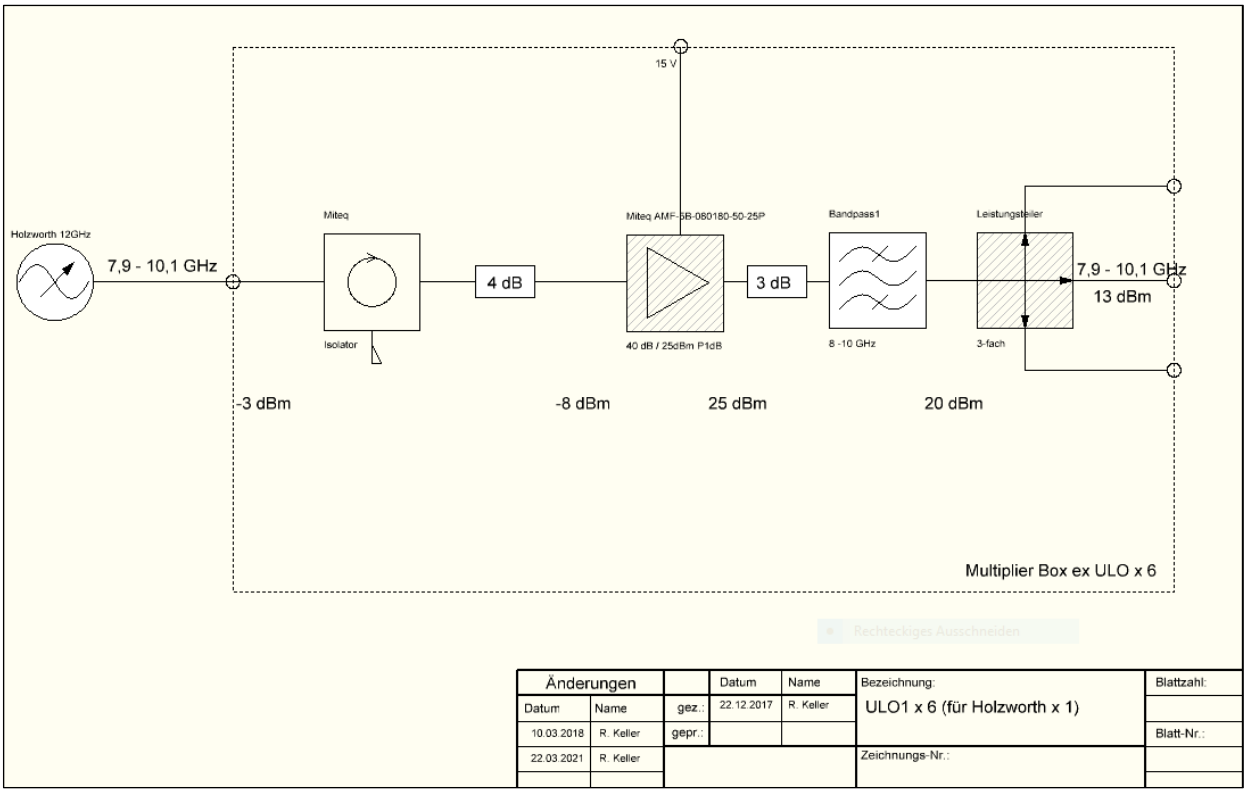
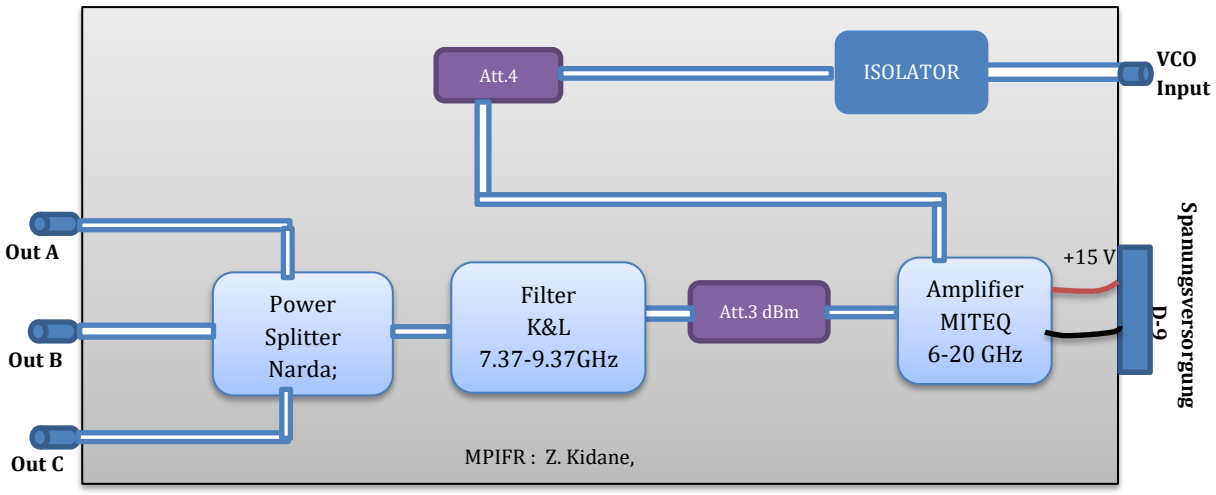


Figure 1: Synthesizer power flow Schematic diagram



AMPLITUDE PERFORMANCE[1]

PARAMETER	MIN[2]	TYPICAL[3]	MAX[2]	COMMENTS
Output Power (Calibrated) 10 MHz to 12 GHz 12 GHz - 18 GHz	 -10 dBm -10 dBm		 +18 dBm +16 dBm	Settable -20 to +23 dBm
Resolution		0.01 dB		
Connector		50 Ω		SMA
SWR (S_{11}) 10 MHz < f ≤ 6 GHz 6 GHz < f ≤ 18 GHz		 1.33 (-17.0 dB) 1.43 (-15.0 dB)		
Maximum Reverse Power Max DC Voltage > 100 kHz	25 V_{DC} maximum by design. 16 dBm max by design.		*** Some applications may require reverse power protection.	
Switching Speed (Amplitude)			100us	Settling to within 0.1dB
Absolute Level Accuracy 10 MHz - 6 GHz 6 GHz - 12 GHz -10 dbm to 5 dBm 5d Bm to 18 dBm 12 GHz - 18 GHz -10 dBm to 5 dBm 5 dBm to 16 dBm		 ± 0.5 dB ± 0.5 dB ± 1 dB ± 0.6 dB ± 1.1 dB		25C to 35C (case temperature)
SSB Phase Noise 2.0 GHz, 10 kHz offset 4.0 GHz, 10 kHz offset 8.0 GHz, 10 kHz offset 12.0 GHz, 10 kHz offset 18.0 GHz, 10 kHz offset		 ≤ -128 dBc/Hz ≤ -122 dBc/Hz ≤ -114 dBc/Hz ≤ -110 dBc/Hz ≤ -106 dBc/Hz		
Harmonics (CW mode)		-30 dBc		
Non-Harmonics (CW mode) 10 MHz to 8 GHz 8 GHz to 18 GHz		 -60 dBc -50 dBc		
Sub-Harmonics (CW mode) 10 MHz to 8 GHz 8 GHz to 18 GHz		 -60 dBc -50 dBc		
Jitter (RMS) at 18 GHz		55 fs		5 kHz < BW < 20 MHz

[1] Specifications are subject to change per the discretion of Holzworth Instrumentation, Inc.
[2] All MIN/ MAX (Minimum/ Maximum) performance parameters are guaranteed and 100% verified during final performance test.
[3] Typical performance is "by design" and consistent with field performance data.

Figure 2: Electrical specification Signal Amplitude

ENVIRONMENTAL SPECIFICATIONS [1]

Environmental specifications are based on component margins, thermal verification testing and current draw tests.

PARAMETER	MIN	TYPICAL	MAX	COMMENTS
Operating Temperature Standard Models Option: OPT-SYS3[2]	 0 C -40C		 +55 C +75C	 Performance tests at: +20C ±5C Performance tests at: -40, +20, +75C ±2C
Temperature Monitor Range	-40 C		+85 C	Absolute
Power Consumption[3] Standard Models Option: OPT-SYS3		 15 W 15 W	 18 W 18 W	 18W during warm-up (OCXO) 18W during warm-up (OCXO)

[1] Specifications are subject to change per the discretion of Holzworth Instrumentation, Inc
[2] Extended temperature testing conducted using an external 100MHz reference.
[3] See PINOUT CONFIGURATION table on page 10 for volt/amp ratings per pin.

Figure 3: Environmental specification

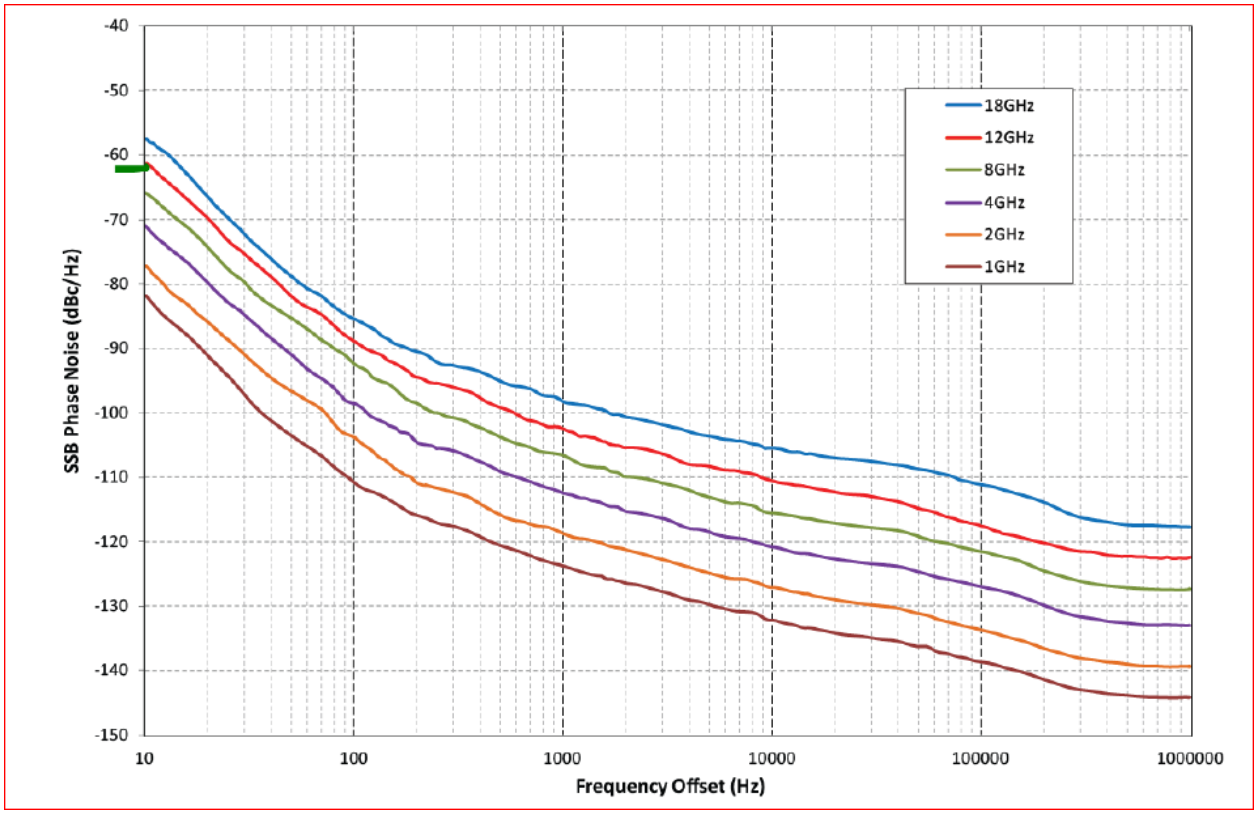


Figure 4: Phase Noise performance

2. The spectral purity performance

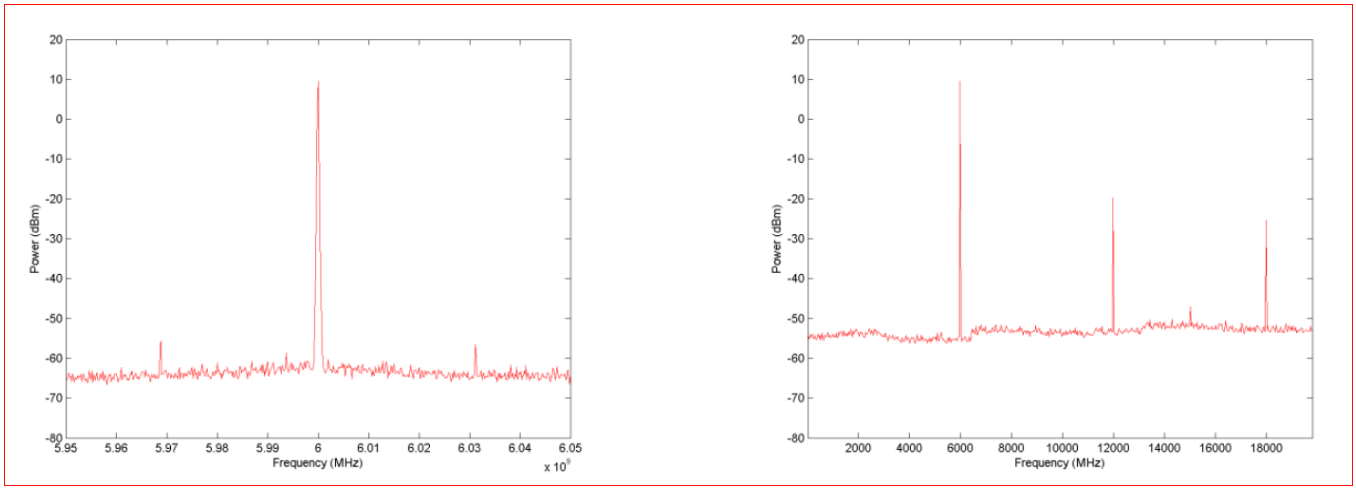


Figure 5: 6GHz Narrow Band Spectrum

Figure 6: 6GHz Broad Band Spectrum