

## EnsembleSeries™ CLK3002

Customizable, 3U OpenVPX clock generation and distribution module

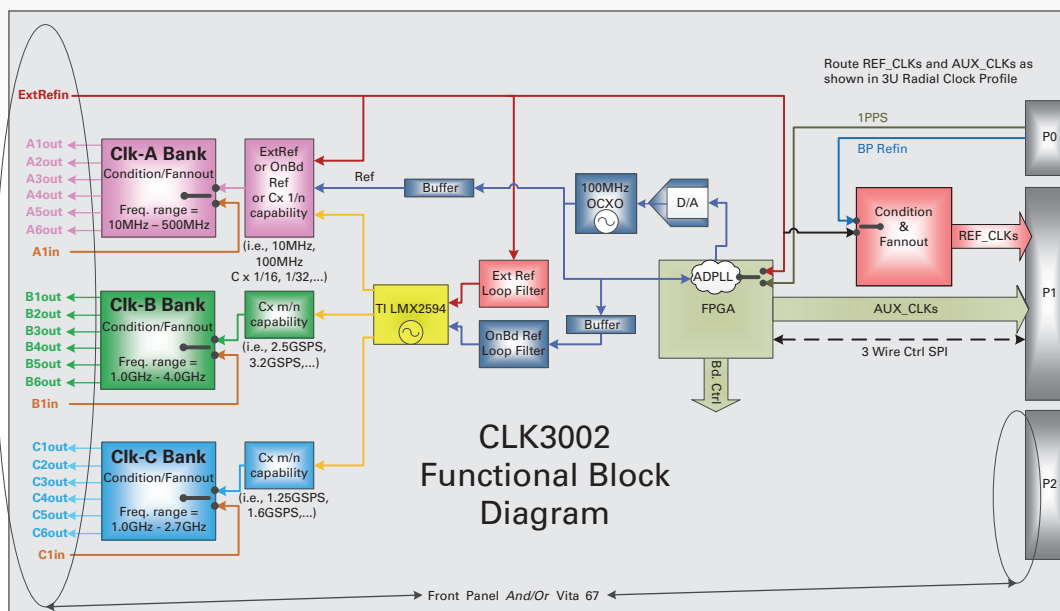
- 3 clock banks with up to 6 clock outputs each
- Scalable and configurable
- External reference support
- Aligned, ultra-low jitter clock distribution
- Radial clock slot profile
- 3U OpenVPX Compliant



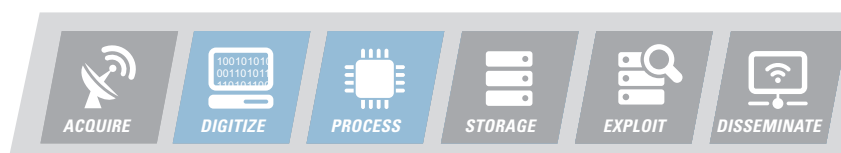
Mercury's EnsembleSeries™ CLK3002 is a customizable, 3U OpenVPX clock generation and distribution solution ideally suited for demanding high-fidelity, coherent signal-processing applications. The three independent clock banks can be customized to specific output rates to support complex system requirements, such as integrated ADCs, DACs, and LO references. To enable high-performance digitization, the CLK3002 has been designed for optimal slew rate with minimal jitter.

Leveraging Mercury's legacy in high-reliability solutions for electronic warfare and radar applications, the CLK3002 is ideal for high performance in harsh environments. The OpenVPX CLK3002 is a modular clocking solution that is customizable for specific customer applications.

### CLK3002 Functional Block Diagram

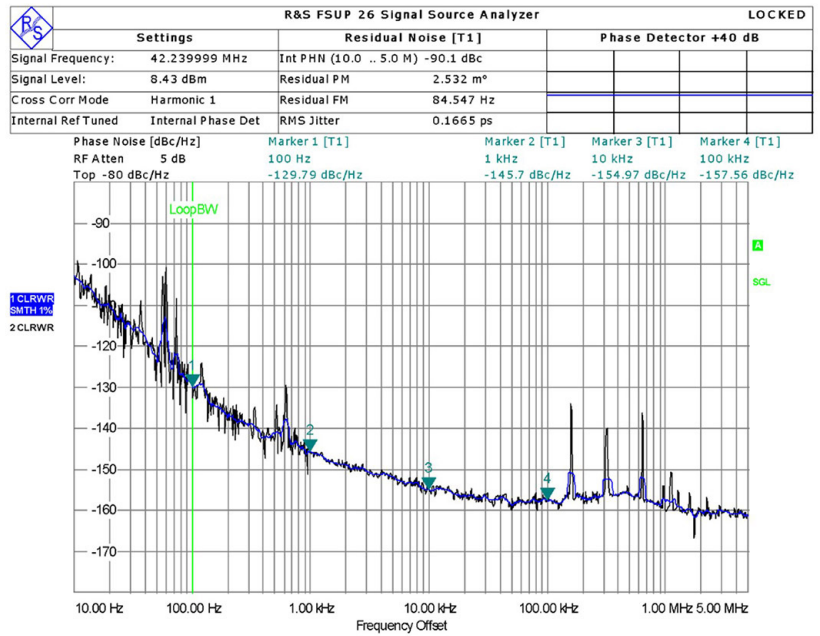


Mercury Systems is a leading commercial provider of secure sensor and safety-critical processing subsystems. Optimized for customer and mission success, Mercury's solutions power a wide variety of critical defense and intelligence programs.

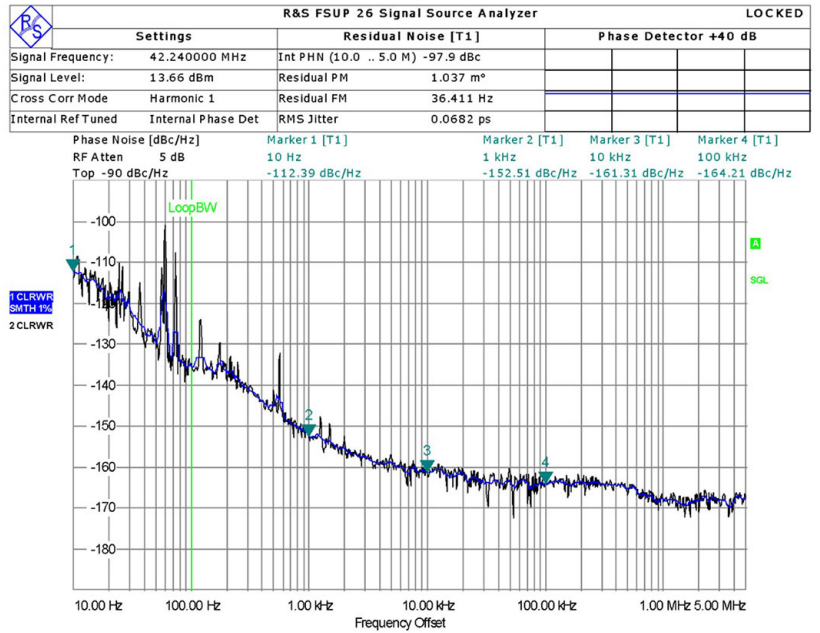


Performance for CLK3002-01 CLK-A Bundle

CLK3002-01				
CLK-A				
CLK-A 42.24 MHz, 10 MHz Reference				
Amplitude	Output 3	8.88	dBm	
	Output 4	8.93	dBm	
	Output 5	8.89	dBm	
	Output 6	8.89	dBm	
Phase Noise	10 Hz	-87.45	dBc/Hz	
	100 Hz	-121.4	dBc/Hz	
	1kHz	-149.4	dBc/Hz	
	10kHz	-154.27	dBc/Hz	
RMS Jitter	Output 1 (10Hz - 5MHz)	0.1665	ps	
Output VSWR	VSWR	1.15		
S22	Return Loss	-23.06	dB	
	Skew	Skew Output 3to4	-2.44	deg
		Skew Output 3to5	-2.19	deg
Skew Output 3to6		-2.02	deg	



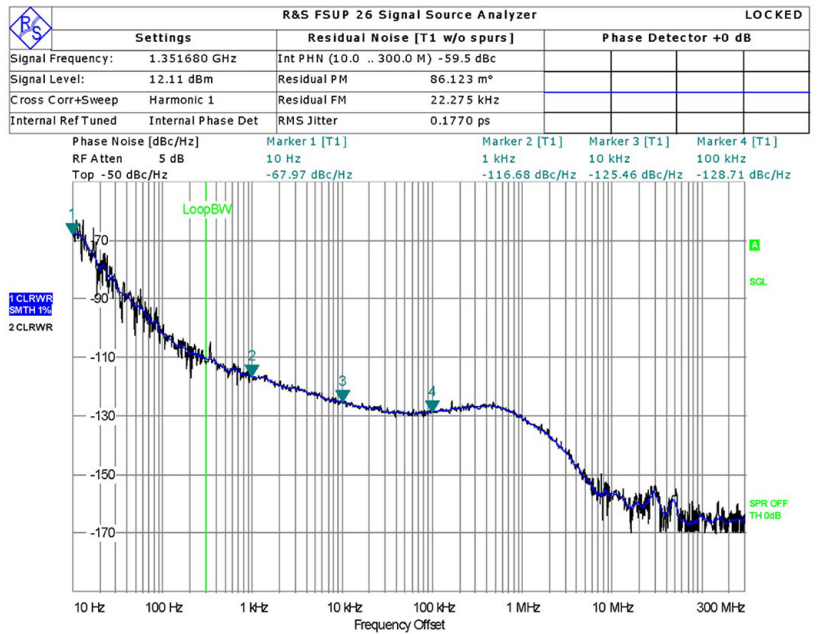
CLK3002-01				
CLK-A				
CLK-A 42.24 MHz, Distributor Mode				
Amplitude	Output 3	13.68	dBm	
	Output 4	13.6	dBm	
	Output 5	13.6	dBm	
	Output 6	13.68	dBm	
Phase Noise	10 Hz	-114.42	dBc/Hz	
	100 Hz	-137.8	dBc/Hz	
	1kHz	-153.16	dBc/Hz	
	10kHz	-160.71	dBc/Hz	
RMS Jitter	Output 6 (10Hz - 5MHz)	0.0682	ps	
Output VSWR	VSWR	1.21		
S22	Return Loss	-20.48	dB	
	Skew	Skew Output 3	-127.22	deg
		Skew Output 4	-126.88	deg
Skew Output 5		-127.14	deg	
	Skew Output 6	-127.22	deg	



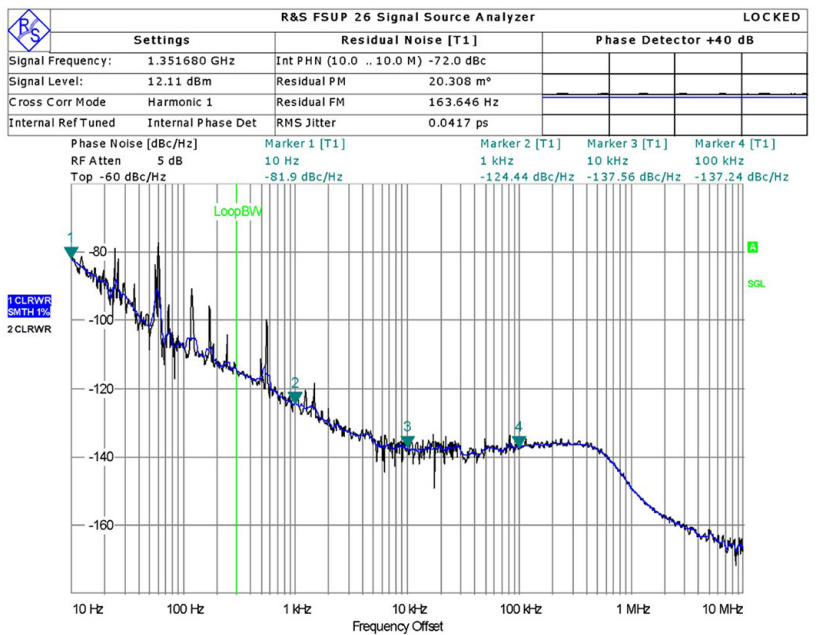
\*All Data taken at 25°C. All values shown are TYPICAL.

Performance for CLK3002-01 CLK-C Bundle

CLK3002-01			
CLK-C			
CLK-C 1.35168 MHz, 10 MHz Reference			
Amplitude	Output 3	9.86	dBm
	Output 4	9.82	dBm
	Output 5	9.69	dBm
	Output 6	9.53	dBm
	10 Hz	-67.97	dBc/Hz
Phase Noise	100 Hz	-101.85	dBc/Hz
	1kHz	-116.68	dBc/Hz
	10kHz	-125.46	dBc/Hz
	100kHz	-128.71	dBc/Hz
RMS Jitter	Output 1 (10Hz - 300MHz)	0.177	ps
Output VSWR	VSWR	1.17	
Skew	S22 Return Loss	-16.38	dB
	Skew Output 3to4	0.5deg	deg
	Skew Output 3to5	1.7deg	deg
	Skew Output 3to6	0.08deg	deg



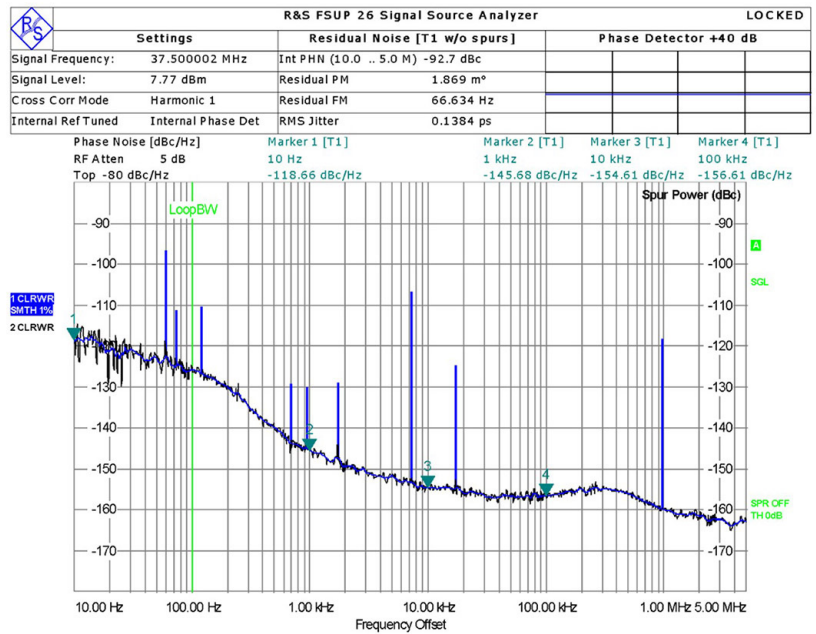
CLK3002-01			
CLK-C			
CLK-C 1.35168 GHz, Distributor Mode			
Amplitude	Output 3	10.23	dBm
	Output 4	10.36	dBm
	Output 5	10.24	dBm
	Output 6	10.24	dBm
	10 Hz	-79.36	dBc/Hz
Phase Noise	100 Hz	-108.71	dBc/Hz
	1kHz	-124.55	dBc/Hz
	10kHz	-136.73	dBc/Hz
	100kHz	-137	dBc/Hz
RMS Jitter	Output 1 (10Hz - 10MHz)	0.0437	ps
Output VSWR	VSWR	1.23	
Skew	S22 Return Loss	-19.95dB	dB
	Skew Output 3	-160.85	deg
	Skew Output 4	-158.91	deg
	Skew Output 5	-153.36	deg
Skew Output 6	-160.31	deg	



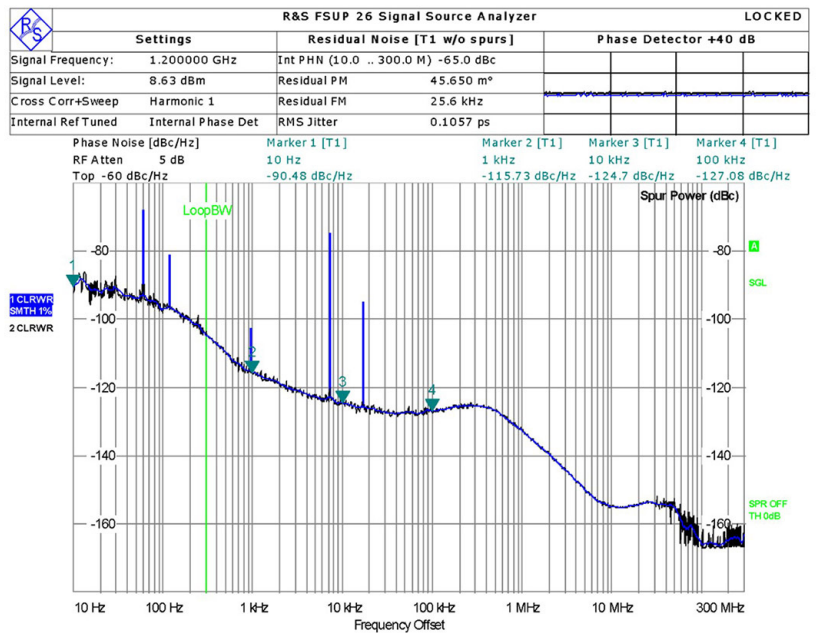
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Performance for CLK3002-11 CLK-A Bundle

CLK3002-11			
CLK-A			
CLK-A 37.5 MHz, 100 MHz reference			
Amplitude	Output 3	7.75	dBm
	Output 4	7.82	dBm
	Output 5	7.8	dBm
	Output 6	7.77	dBm
Phase Noise	10 Hz	-118.66	dBc/Hz
	100 Hz	-125.9	dBc/Hz
	1kHz	-145.68	dBc/Hz
	10kHz	-154.61	dBc/Hz
	100kHz	-156.61	dBc/Hz
RMS Jitter	Output 1 (10Hz - 10MHz)	0.1384	ps
Output VSWR	VSWR	1.24	
S22	Return Loss	-19.17	dB



CLK3002-11			
CLK-C			
CLK-C 1.2 GHz, 100 MHz Source			
Amplitude	Output 3	10.3	dBm
	Output 4	10.33	dBm
	Output 5	10.22	dBm
	Output 6	10.3	dBm
Phase Noise	10 Hz	-90.48	dBc/Hz
	100 Hz	-105	dBc/Hz
	1kHz	-115.73	dBc/Hz
	10kHz	-124.7	dBc/Hz
	100kHz	-127.08	dBc/Hz
RMS Jitter	Output 1 (10Hz - 300MHz)	0.1057	ps
Output VSWR	VSWR	1.73	
S22	Return Loss	-11.51	dB

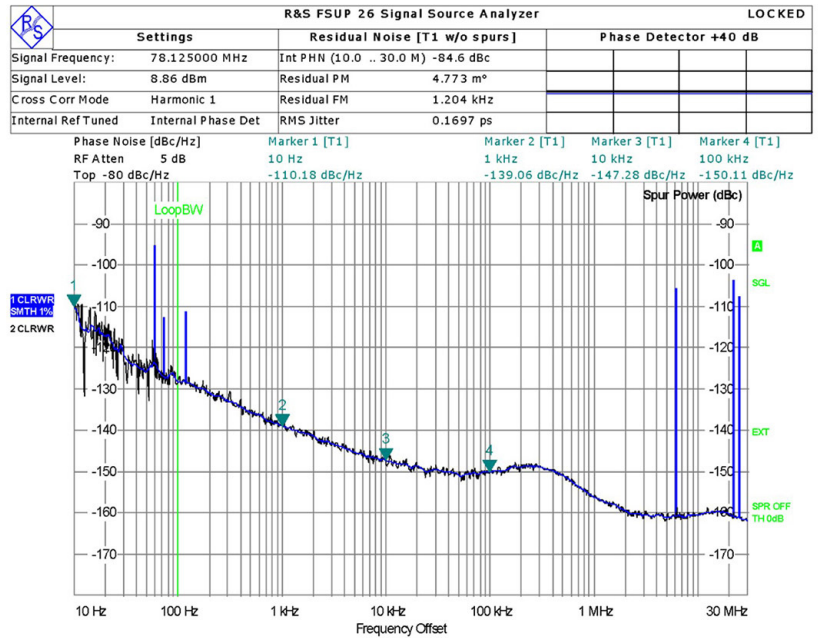


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Performance for CLK3002-21 CLK-A Bundle

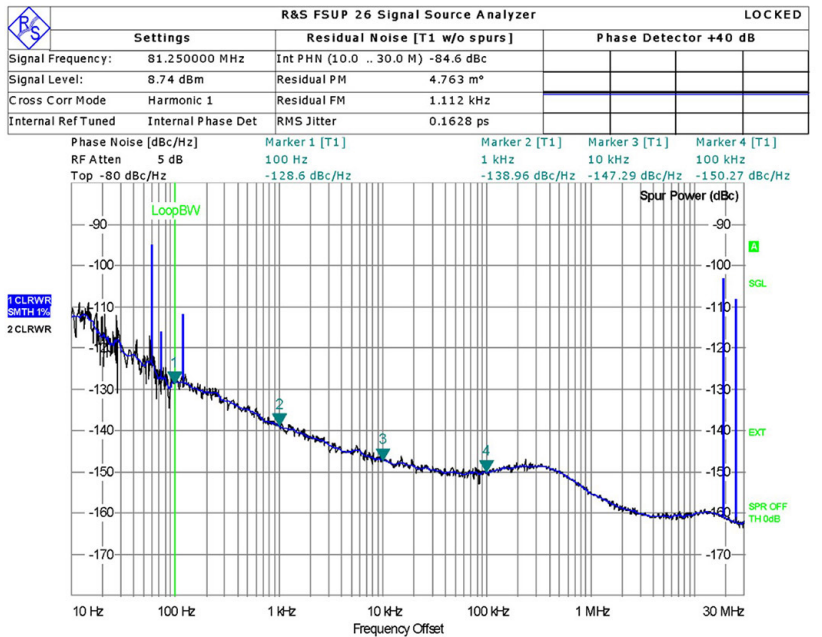
CLK3002-21		
CLK-A		
Switch Setting #1		

CLK-A 78.125MHz, 100MHz Source			
Amplitude	Output 3	8.73	dBm
	Output 4	8.77	dBm
	Output 5	8.87	dBm
	Output 6	8.86	dBm
Phase Noise	10 Hz	-110.18	dBc/Hz
	100 Hz	-128.55	dBc/Hz
	1kHz	-139.06	dBc/Hz
	10kHz	-147.28	dBc/Hz
	100kHz	-150.11	dBc/Hz
RMS Jitter	Output 6 (10Hz - 30MHz)	0.1697	ps
Output VSWR	VSWR	1.12	
S22	Return Loss	-24.83	dB
Skew	Skew 3to4	0.4	deg
	Skew 3to5	0.7	deg
	Skew 3to6	0.7	deg



CLK3002-21		
CLK-C		
Switch Setting #2		

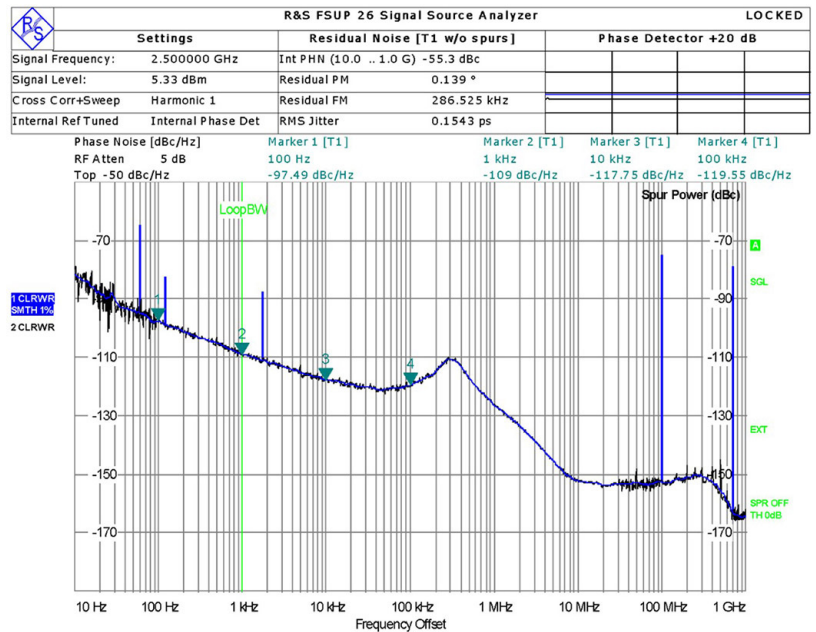
CLK-A 81.25MHz, 100MHz Source			
Amplitude	Output 3	8.57	dBm
	Output 4	8.61	dBm
	Output 5	8.7	dBm
	Output 6	8.74	dBm
Phase Noise	10 Hz	-112.58	dBc/Hz
	100 Hz	-128.6	dBc/Hz
	1kHz	-138.96	dBc/Hz
	10kHz	-147.29	dBc/Hz
	100kHz	-150.27	dBc/Hz
RMS Jitter	Output 6 (10Hz - 30MHz)	0.1628	ps
Output VSWR	VSWR	1.74	
S22	Return Loss	-11.33	dB
Skew	Skew 3to4	0.6	deg
	Skew 3to5	0.8	deg
	Skew 3to6	1	deg



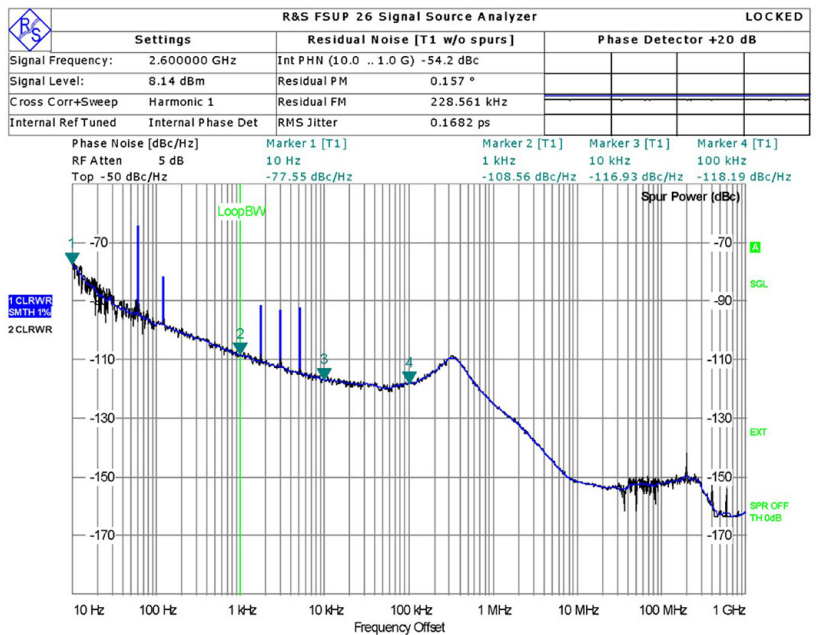
\*All Data taken at 25°C. All values shown are TYPICAL.

Performance for CLK3002-21 CLK-B Bundle

CLK3002-21			
CLK-B			
Switch Setting #1			
CLK-B 2.5 GHz, 100MHz Source			
Amplitude	Output 3	5.34	dBm
	Output 4	5.2	dBm
	Output 5	5.27	dBm
	Output 6	5.31	dBm
Phase Noise	10 Hz	-71.7	dBc/Hz
	100 Hz	-96.97	dBc/Hz
	1kHz	-109.71	dBc/Hz
	10kHz	-118.88	dBc/Hz
RMS Jitter	Output 6 (10Hz - 1GHz)	0.1543	ps
Output VSWR	VSWR	1.21	
	S22 Return Loss	-20.61	dB
Skew	Skew 3to4	9.5	deg
	Skew 3to5	8.5	deg
	Skew 3to6	16.3	deg



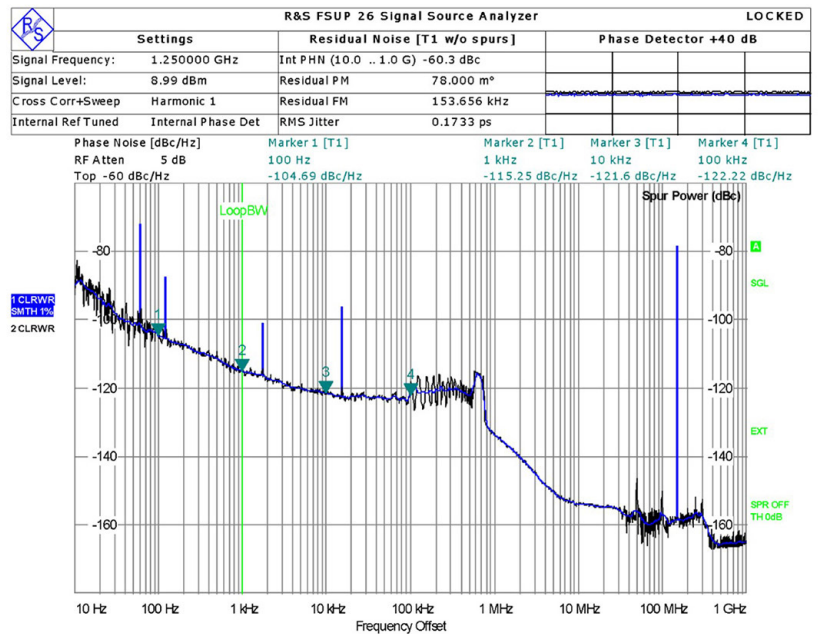
CLK3002-21			
CLK-B			
Switch Setting #2			
CLK-B 2.6 GHz, 100MHz Source			
Amplitude	Output 3	8.2	dBm
	Output 4	8.03	dBm
	Output 5	8.14	dBm
	Output 6	8.14	dBm
Phase Noise	10 Hz	-77.85	dBc/Hz
	100 Hz	-98	dBc/Hz
	1kHz	-108.56	dBc/Hz
	10kHz	-116.93	dBc/Hz
RMS Jitter	Output 6 (10Hz - 1GHz)	0.1682	ps
Output VSWR	VSWR	1.15	
	S22 Return Loss	-23.09	dB
Skew	Skew 3to4	9.3	deg
	Skew 3to5	7.4	deg
	Skew 3to6	15.6	deg



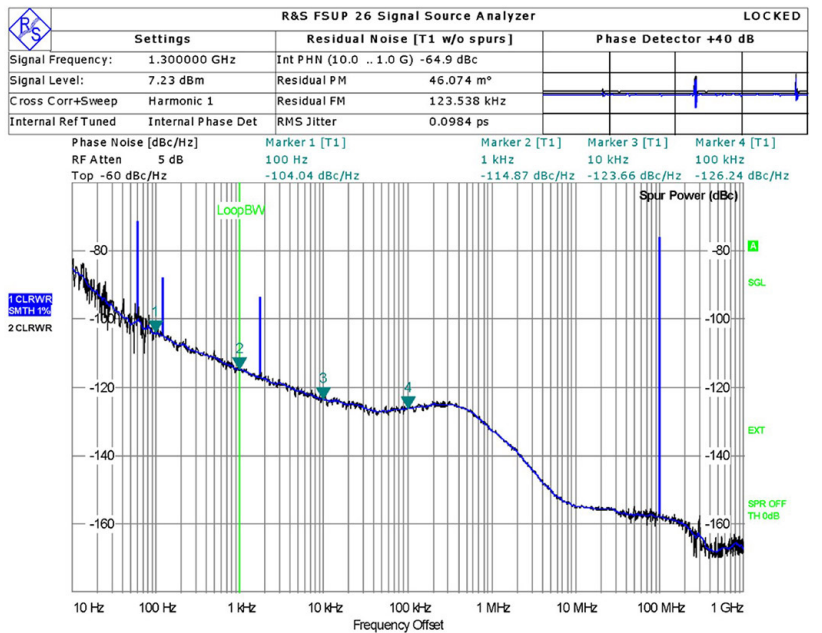
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Performance for CLK3002-21 CLK-C Bundle

CLK3002-21			
CLK-C			
Switch Setting #1			
CLK-C 1.25GHz, 100 MHz Source			
Amplitude	Output 3	8.84	dBm
	Output 4	8.91	dBm
	Output 5	8.85	dBm
	Output 6	8.99	dBm
Phase Noise	10 Hz	-90	dBc/Hz
	100 Hz	-104.69	dBc/Hz
	1kHz	-115.25	dBc/Hz
	10kHz	-121.6	dBc/Hz
RMS Jitter	Output 6 (10Hz - 1GHz)	0.1733	ps
Output VSWR	VSWR	1.64	
	S22 Return Loss	-12.29	dB
Skew	Skew 3to4	4.2	deg
	Skew 3to5	3.8	deg
	Skew 3to6	4.8	deg



CLK3002-21			
CLK-C			
Switch Setting #2			
CLK-C 1.3 GHz, 100MHz Source			
Amplitude	Output 3	7.09	dBm
	Output 4	7.16	dBm
	Output 5	7.1	dBm
	Output 6	7.23	dBm
Phase Noise	10 Hz	-85.13	dBc/Hz
	100 Hz	104.04	dBc/Hz
	1kHz	-114.87	dBc/Hz
	10kHz	-123.66	dBc/Hz
RMS Jitter	Output 6 (10Hz - 1GHz)	0.0984	ps
Output VSWR	VSWR	1.74	
	S22 Return Loss	-11.33	dB
Skew	Skew 3to4	4.9	deg
	Skew 3to5	5.1	deg
	Skew 3to6	5.5	deg



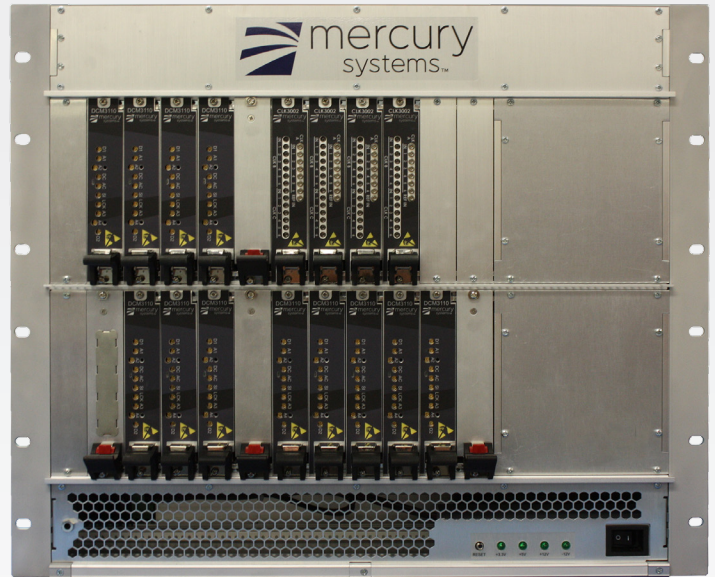
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**Application Notes:**

The CLK3002 is a flexible and configurable clock source solution. The three clock banks, with six outputs each, are factory configurable ensuring maximum flexibility without compromising performance. This high performing, ruggedized module is ideal for applications requiring low phase noise.

A single CLK3002 clock module is capable of supporting multiple digitization and processing modules as part of a complex EW system. For example, the three banks of synchronous clock sources can drive both ADC and DAC circuitry as well as providing an LO reference to microwave modules.

The CLK3002 has been qualified in a field-deployed L-band direct digitization system. This system uses the CLK3002 modules to drive 12 DCM3110 digital transceiver/processing modules. To learn more, contact Mercury Systems at [digital.rf@mrcy.com](mailto:digital.rf@mrcy.com)



L-band direct digitization system

**Environmental**

Rugged Level		VITA - Standard Product Environmental Qualification Levels			
		Air-cooled	Conduction-cooled	Air Flow-By	Liquid Flow-By
Temperature	Operating	-25°C to +55°C (at air intake)	-40°C to +71°C (at module edge)	-40°C to +55°C (at air intake)	-40°C to +71°C
	Storage	-55°C to +85°C	-55°C to +125°C	-55°C to +125°C	-55°C to +125°C
	Max Rate of Change	5°C/min	10°C/min	10°C/min	10°C/min
Humidity	Operating*	5-95%, non-condensing	5-95%, non-condensing	5-95%, non-condensing	5-95%, 100% condensing
	Storage	5-95%, non-condensing	100% condensing	100% condensing	5-95%, non-condensing
Altitude	Operating*	0-30,000ft	0-70,000ft	0-70,000ft	0-70,000ft
	Storage	0-50,000ft	0-70,000ft	0-70,000ft	0-70,000ft
Vibration	Random	0.04 g2/Hz; 20-2000 Hz, 1 hr/axis	0.1 g2/Hz; 5-2000 Hz, 1 hr/axis	0.1 g2/Hz; 5-2000 Hz, 1 hr/axis	0.1 g2/Hz; 5-2000 Hz, 1 hr/axis
	Sine	N/A	10G peak; 5-2000 Hz, 1 hr/axis	10G peak; 5-2000 Hz, 1 hr/axis	10G peak; 5-2000 Hz, 1 hr/axis
	Shock	z-axis: 50g; x and y-axes: 80g; (11ms, 1/2-sine pulse, 3 positive, 3 negative)			
Salt/Fog		Contact Factory	10% NaCl		
VITA 47		Contact Factory			

**Need More Help? Need a Variant of This Product?**

Contact Mercury's Mixed Signal Engineering team at: [digital.rf@mrcy.com](mailto:digital.rf@mrcy.com) or visit [www.mrcy.com/mixed-signal-processing](http://www.mrcy.com/mixed-signal-processing) for a detailed listing of OpenVPX products

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