

HMC-T1000A

DUAL SYNTHESIZED SIGNAL GENERATOR, 10 MHz to 8 GHz



13

SYNTHESIZED SIGNAL GENERATOR

Low Phase Noise Fast Switching Synthesizer

Introducing a new synthesized microwave signal generator from Hittite that delivers “best in class” ultra low phase noise performance coupled with fast 10 microsecond switching in a standard 19” rack-mountable 3U chassis. The HMC-T1000A integrates two, independently controllable/programmable, 10 MHz to 8 GHz synthesizers.

Innovative MMICs = Revolutionary Synthesizer

Based upon 20+ years of Hittite proprietary MMIC technology, packaging expertise and our unique synthesizer architecture, the HMC-T1000A achieves SSB phase noise performance of -135 dBc/Hz at 100 kHz offset; a 10 dB improvement over any microwave synthesizer in the same class.

Programmable & Flexible for all Applications

Both BCD-parallel and RS-232 interfaces enable independent control of each multi-decade synthesizer. Power supply inputs include 100V to 240V 50/60 Hz AC or 48V DC. The HMC-T1000A is a flexible solution for all production test, R&D and communications applications.

Applications

- ◆ ATE
- ◆ Test & Measurement
- ◆ R&D Laboratories

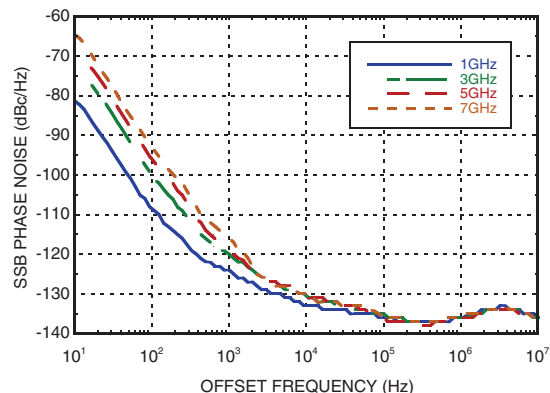
Performance

- ◆ Low Phase Noise: -135 dBc/Hz @ 100 kHz
- ◆ Fast Switching Speed: 10 μ s
- ◆ Low Spurious Output: -75 dBc
- ◆ Wide Output Power Range: -80 dBm to +15 dBm

Advantages

- ◆ Accuracy: Fine Control
Frequency Resolution: 0.001 Hz
Output Power: 0.01 dB
- ◆ Convenience: Two Synthesizers in One Box
- ◆ Flexible: BCD-Parallel & RS-232 Interfaces Enable Independent Control

SSB Phase Noise Performance



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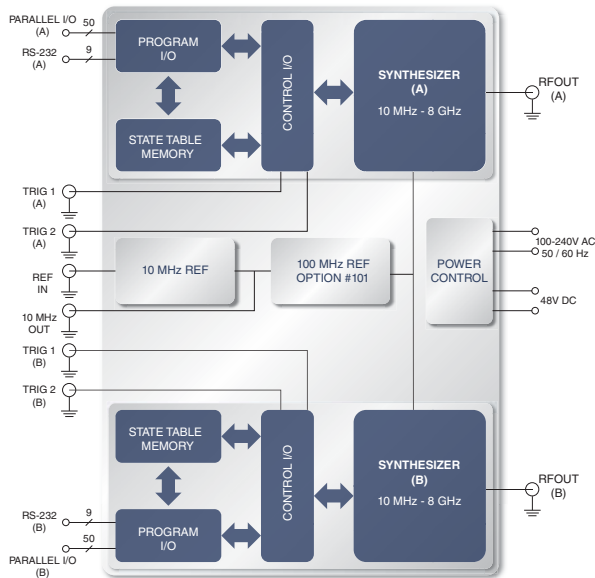
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Functional Diagram



Frequency

- Range: 10 MHz to 8 GHz
- Resolution: 0.001 Hz
- Switching Speed: 10 μ sec to within 10 Degrees
- Accuracy: Same as Internal Reference
- Reference Output: 10 MHz @ +7 dBm \pm 4 dB
- External Reference Input: 10 MHz @ +7 dBm \pm 4 dB

Step Sweep

- Operational Modes:
 - Fully Programmable via State Table
- Stepped Sweep Range: 10 MHz to 8 GHz
- Dwell Time: 0 to 1080 Seconds, 8 ns Increments
- Number of States: 65,536 Maximum
- Triggering: Logic Level Input or Output, Software Definable

Output Power

- General: 2 Independently Controllable/Programmable RF outputs (T1000A)
- Power (dBm):
 - 10 Hz to 7 GHz +15 dBm to -80 dBm
 - 7 GHz to 8 GHz +10 dBm to -80 dBm

Level Accuracy	Frequency	>0 dBm	-30 to 0 dBm	-100 to -30 dBm
	10 MHz to 5 GHz	\pm 1	\pm 1	\pm 2
	5 GHz to 8 GHz	\pm 1.5	\pm 1	\pm 2

- Resolution: 0.01 dB
- VSWR: <1.8:1 (Fout >20 MHz)

Spectral Purity

Spurious: -75 dBc Typical; -70 dBc Max.

Enhanced SSB Phase Noise (dBc/Hz) *	Offset From Carrier				
	100 Hz	1 kHz	10 kHz	100 kHz	1 MHz
10 MHz to 1 GHz	-110	-124	-133	-135	-133
>1 GHz to 3 GHz	-100	-120	-130	-135	-133
>3 GHz to 5 GHz	-97	-118	-130	-135	-133
>5 GHz to 7 GHz	-94	-117	-130	-135	-133
8 GHz	-92	-116	-130	-135	-133

Internal 10 MHz Reference

Output Power: +7 dBm \pm 4 dB

SSB Phase Noise (dBc/Hz)	Offset From Carrier			
	100 Hz	1 kHz	10 kHz	>50 kHz
10 MHz Output	-140	-150	-155	-155

Remote Programming

- Interfaces:
 - RS-232, Parallel (50 Pin TTL)
 - State Number or BCD Frequency

I/O Connections

Each synthesizer (A & B) is independently controlled by a standard RS-232 programming connection and a high speed 50-pin parallel connection. The 50-pin parallel connection provides random access to a 65,536 element state table stored in non-volatile memory. The state table provides 10 microsecond state transitions for frequency, amplitude, or both. The synthesizer initializes to state 0 upon turn-on allowing the synthesizer to operate in an embedded application without connection to the RS-232 interface. Each synthesizer has input and output hardware trigger connectors which allow remote state table control by external equipment and an independent dwell time for each state for synchronous stepped sweeps or independent operation. The 50-pin parallel connection also provides BCD frequency control with 10 μ s arbitrary frequency changes.

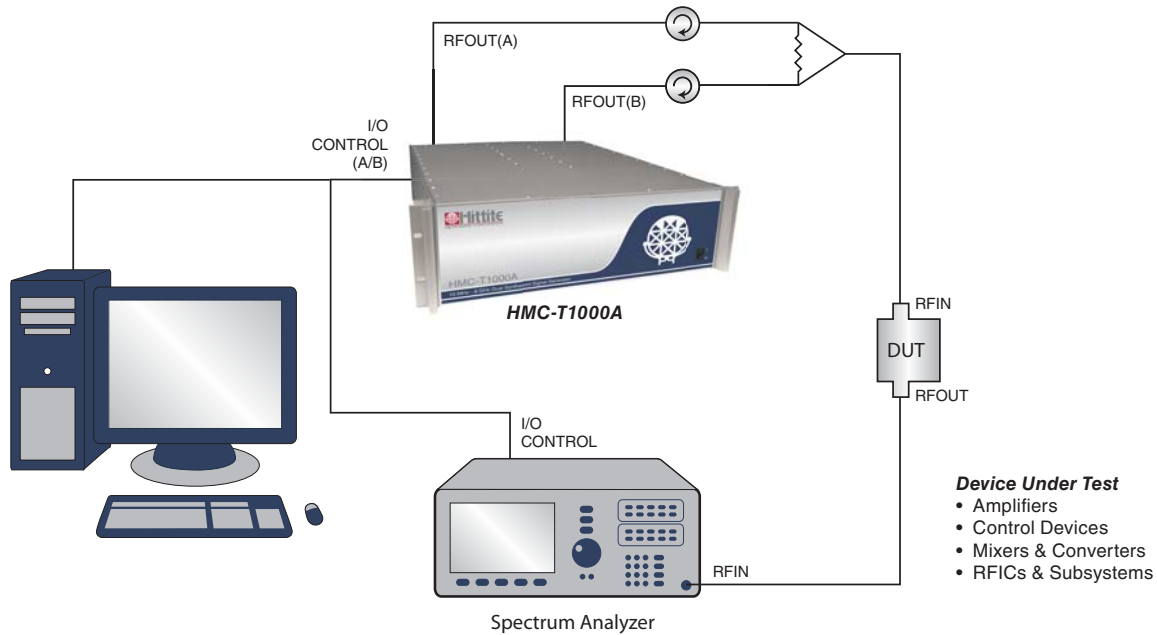
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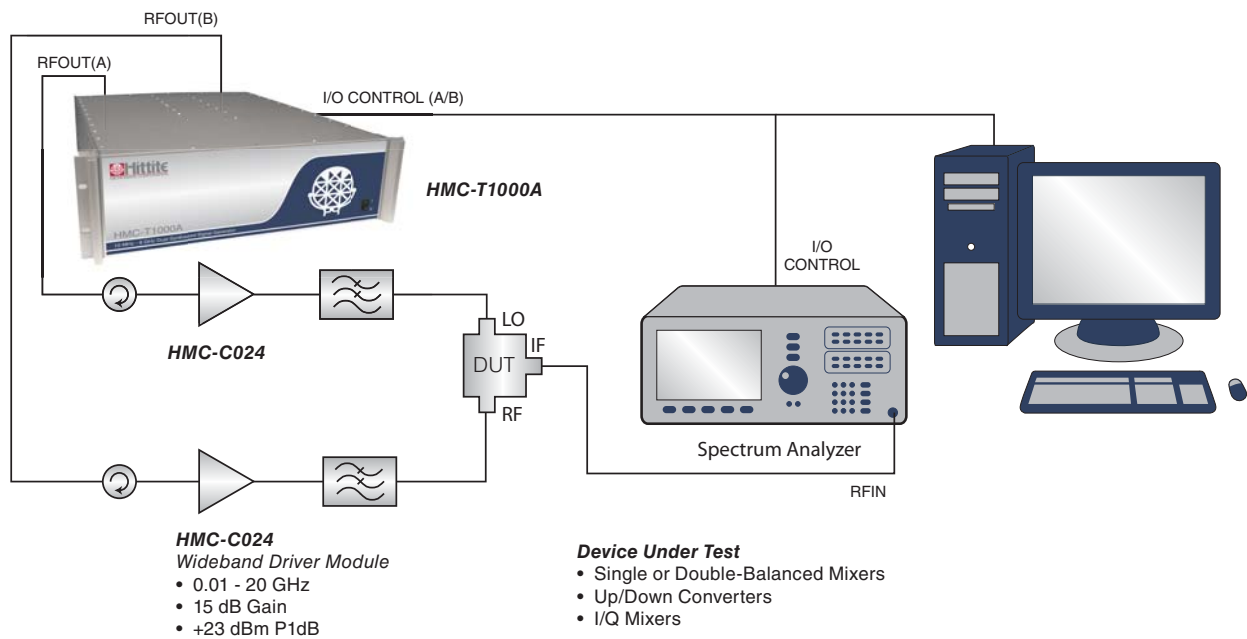
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Test & Measurement Applications for the HMC-T1000A

Second & Third Order Intermodulation Intercept Test Set-up



High Speed Mixer Conversion Loss, Isolation & MxN Spurious Test Set-up



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Flexible Architecture to Meet Your Current and Future Needs

With an output power range of -80 dBm to +15 dBm, and an output power resolution of 0.01 dB, the HMC-T1000A can satisfy the dynamic range requirements of most test and communication environments without the need for external amplifiers and attenuators. The 10 MHz to 8 GHz bandwidth combined with the 0.001 Hz output frequency resolution, makes the HMC-T1000A appropriate for both narrowband and wideband applications. In addition, since the HMC-T1000A employs a modular design approach, and a MMIC based architecture, Hittite is able to provide customized synthesizer configurations to address your most challenging requirements.

Capability Enhancements Available for the HMC-T1000A

18 GHz Operation

The Dual Synthesizer can be configured for wide band operation of up to 18 GHz, making it ideal for production test, R&D, communications, sensor and broadband subsystem applications.

In Phase and Quadrature (I/Q) Modulation

The Dual Synthesizer can be configured with an integrated, high dynamic range I/Q modulator. External I/Q ports would enable the user to use the Dual Synthesizer to create a wide variety of waveforms.

Software Interface

The HMC-T1000A can be driven from virtually any software driven controller. A Labview driver is provided, as well as a comprehensive programming manual describing all of the available commands and their functions.

General Specifications

AC Supply: 100 to 240 VAC, 50 to 60 Hz

DC Optional Supply: 48 VDC

Power: 220W (Typ.)

Calibration: 1 Year

Environment (for indoor use only): 0 to 35 °C

Cooling: Forced Air

Input/Output: RF Out: SMA Connector

10MHz Ref : BNC Connector

Trigger Inputs: BNC Connector

Digital Control:

9 Pin RS-232 Serial or

50 Pin BCD Parallel

General Mechanical Characteristics

Standard 19" Rack-Mountable 3U Chassis

Dimensions: 22.75" [577.9 mm] x

16.75" [425.5 mm] x 5.25" [133.4 mm]*

*Includes back panel connector clearance

Weight 38 lbs (17.2 kg)

Warranty: 1 Year

Ordering Information

Part Number	Description
HMC-T1000	Synthesized Signal Generator 10 MHz to 8 GHz
HMC-T1000A	Dual Synthesized Signal Generator 10 MHz to 8 GHz

I/O Connections for the HMC-T1000A



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