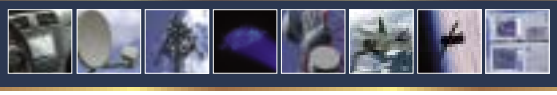
HMC-T2220B



Portable Synthesized Signal Generator, 10 MHz to 20 GHz

Portable & Battery Operated!

ANALOG DEVICES

Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Specifications subject to change without notice. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices. Trademarks and registered trademarks are the property of their respective owners.

HMC-T2220B

PORTABLE SYNTHESIZED SIGNAL GENERATOR, 10 MHz to 20 GHz

v06.0216

Battery Operated 20 GHz Signal Generator!

The HMC-T2220B is a battery powered, portable test equipment solution designed to fulfill your signal generation needs in the field or on the bench. The HMC-T2220B provides the highest output power, lowest harmonic levels and broadest frequency range amongst portable signal generators of its size and cost.

Internal rechargeable batteries allow for 4 hours of continuous operation, making the HMC-T2220B a portable and versatile instrument, which is particularly attractive for wireless/wired service installation, field testing or remote on-site maintenance applications. The HMC-T2220B also features USB, GPIB and Ethernet interfaces with innovative control software ensuring carefree integration within various test environments while improving overall productivity and equipment utilization.

The HMC-T2220B incorporates several product upgrades: reduced spurious, wider dynamic range, higher frequency resolution, higher RF output power, reduced RF off leakage, quieter fan operation, improved front panel knob functions for display scrolling and an added TRIGGER OUT function.

Applications

- Field Testing
- Service Installation
- ATE, Test & Measurement
- R&D Laboratories

Advantages

- Portable: 5 kg (11 lbs) [1]
- Versatile: High Power Simplifies Test Set-Ups
- Efficient: 300 µs Frequency Switching
- Flexible: Manual or Software Control Via USB, GPIB or Ethernet
- Reliable, Incorporates Hittite MMICs

Performance

- Battery Operation: 4 Hours [2]
- High Output Power: +26 dBm @ 1 GHz
- Wide Frequency Range: 10 MHz to 20 GHz
- Excellent Phase Noise Performance: -98 dBc/Hz @ 10 kHz Offset @ 10 GHz
- Spurious Rejection: -70 dBc @ 10 GHz
- Power Resolution: 0.1 dB
- Frequency Resolution: 1 Hz

Four Hours Continuous Operation!

[1] Weight includes two batteries
[2] Continuous operation from a fully charged condition with 2 batteries

HMC-T2220B

PORTABLE SYNTHESIZED SIGNAL GENERATOR, 10 MHz to 20 GHz

v06.0216

Frequency

Accuracy: As Per Internal Ref. ±1.5 ppm
Resolution: 1 Hz
Internal Reference: 10 MHz
Aging Rate: <1 ppm/yr
External Reference Input: 10 MHz (Sine)
Internal Reference Output: 10 MHz (Square Wave)
Frequency Switching: 300 µs

Output Power (Maximum)

Frequency (GHz)	Power Output (dBm)
0.01	24
0.05	26
0.1	26
0.5	26
1	26
2	25
4	25
10	25
15	24
20	21

Minimum Settable: -35 dBm
Dynamic Range: >60 dB
Resolution: 0.1 dB
Power Accuracy: ± 1 dB > 500 MHz
± 2 dB ≤ 500 MHz
± 2 dB < -20 dBm (All Frequencies)
RF Off: < -80dBm

Spurious @ 10 dBm Output

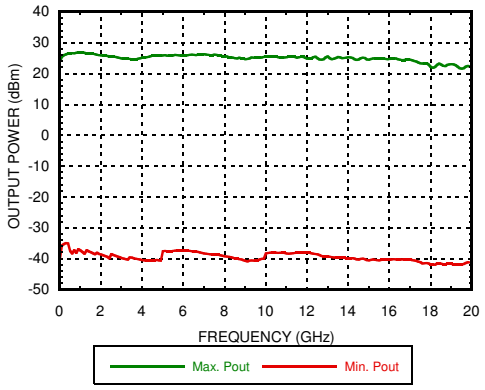
< -70 dBc @ Integer Frequencies
< -65 dBc @ Fractional Frequencies <10 GHz
< -57 dBc @ Fractional Frequencies >10 GHz

Harmonics

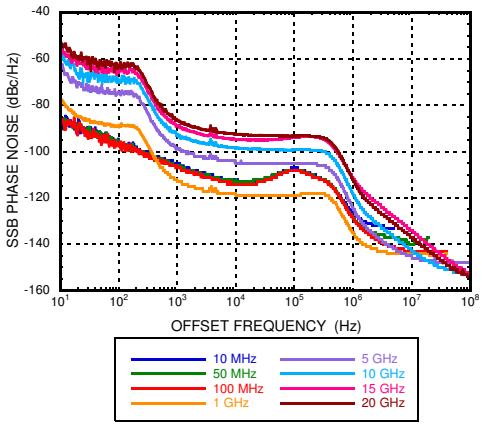
Frequency (GHz)	2nd Harmonics (dBc)	3rd Harmonics (dBc)
0.01	-34	-44
0.05	-30	-42
0.1	-31	-46
0.5	-34	-55
1	-33	-52
2	-43	-57
5	-32	-54
10	-34	-58
15	-39	-48
20	-55	-

Output Power = +10 dBm

Output Power Range @ 25°C



SSB Phase Noise vs. Frequency



RF Output Impedance

VSWR < 2.0:1

SSB Phase Noise (dBc/Hz)

Frequency (GHz)	Offset From Carrier						
	10 Hz	100 Hz	1 kHz	10 kHz	100 kHz	1 MHz	10 MHz
0.01	-87	-97	-106	-113	-107	-126	-140
0.05	-86.4	-96.2	-106	-112	-108	-128	-140
0.10	-86	-97	-107	-114	-108	-129	-143
0.50	-82	-95	-119	-125	-125	-139	-143
1	-77	-89	-113	-119	-119	-135	-144
5	-64	-75	-99	-105	-105	-124	-145
10	-58	-69	-92	-98	-99	-118	-143
15	-56	-66	-89	-95	-94	-111	-134
20	-51	-63	-86	-92	-93	-112	-137

Output Noise: Floor < -155 dBc/Hz

Above data is typical performance at +25 °C after 30 minutes of warm-up time unless otherwise stated.

HMC-T2220B

PORTABLE SYNTHESIZED SIGNAL GENERATOR, 10 MHz to 20 GHz

v06.0216

General Specifications

Frequency:
- Accuracy:
  - For < 2.5 GHz, Reference +0/-90 nHz
  - For > 2.5 GHz, Reference +0/-2.88 uHz
- Internal Reference: ±1.5 ppm
- Resolution: 1 Hz
- Aging Rate: <1 ppm/yr
- External Reference Input: 10 MHz (Sine Wave)
- Internal Reference Output: 10 MHz (Square Wave)
- Frequency Switching Speed: 300 µs

RF Output Power Change Versus Temperature:

10 MHz to 5 GHz	0.10 dB/°C
5 GHz to 15 GHz	0.125 dB/°C
15 GHz to 20 GHz	0.20 dB/°C

Input / Output:
- 10 MHz REFOUT [1]
- 10 MHz REFIN [2]
- TRIGGER IN [3]: TTL
- TRIGGER OUT [3]: TTL
- RS-232 (used for field upgrades)
- Ethernet
- GPIB
- USB 2.0
- RF Output SMA Female
- Maximum DC voltage applied to RF Output: 8 Volts

Power - AC:
- 100 to 240 VAC @ 50 to 60 Hz

Power - Battery:
- Type: Lithium Ion, Capacity: 6750 mAh (73Wh)
- Rated Voltage: 10.8 V

Operating Temperature: 0 to 35 °C

Storage Temperature: -20 to 70 °C

Cooling: 2 Internal Fans

Fan Noise: < 50 dBa

Mechanical Vibration & Shock:
- MIL PRF-288000 Class 4, non operating

Compliance:
- CSA & CE

ECCN:
- EAR99

General Mechanical Characteristics
- H: 76.2 mm (3 in)
- W: 203 mm (8 in)
- D: 305 mm (12 in)
- Weight 5.0 kg (11.0 lbs)

Warranty: 1 Year Parts and Labor

[1] +10 dBm max into 50 Ohms; BNC Connector
[2] +5 dBm max., -5 dBm min., 50 Ohms; BNC Connector
[3] The trigger input can be driven from either 3.3 V or 5 V sources for direct interface with TTL signal levels; BNC Connector

Above data is typical performance at +25°C after 30 minutes of warm-up time unless otherwise stated.

Battery Operation

The HMC-T2220B contains two removable batteries, plus an internal battery charger that automatically recharges the batteries when the HMC-T2220B is powered from an AC source. The HMC-T2220B can continuously operate with one (2 hours) or two (4 hours) batteries. The recharge time for either one or two batteries is 6.5 hours during which the unit can be operated.

Remove both batteries during transport

For proper battery use and storage please see the “Safety” section of the HMC-T2220(B)/40 User Manual. To view the HMC-T2220(B)/40 User Manual, please visit www.hittite.com and choose HMC-T2220B, HMC-T2220, or HMC-T2240 from the “Search by Part Number” pull down menu.

HMC-T2220B

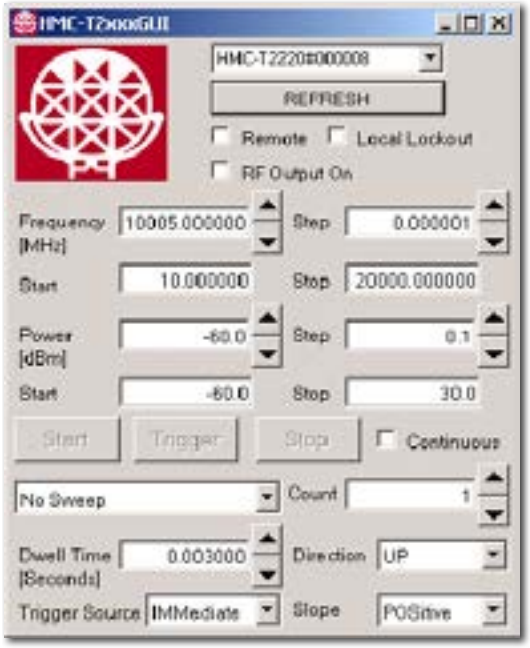
PORTABLE SYNTHESIZED SIGNAL GENERATOR, 10 MHz to 20 GHz

v06.0216

Rear Panel I/O Connections

Connectivity & Control

Its compact size, light weight, fast switching speed and USB, GBIP and Ethernet control interfaces support the standard SCPI command set ensuring smooth integration within all test environments, particularly those associated with automated test. An installation disk that accompanies each unit includes all the drivers required to remotely control the device as well as a user friendly GUI interface (right) compatible with a Windows XP®, Windows Vista® or Windows 7® operating system. User control is facilitated via pull down menus that allow programming of single or swept modes in frequency or power. Integration of multiple units within a production test environment is easy, and affordable.



Remote Interface

Hardware: USB (Windows XP®, Windows 7®, Windows Vista® Drivers Supplied), GPIB or Ethernet

Software: LabVIEW 2009 Driver

Frequency Switching Speed: 300 µs Typ.

Local Interface

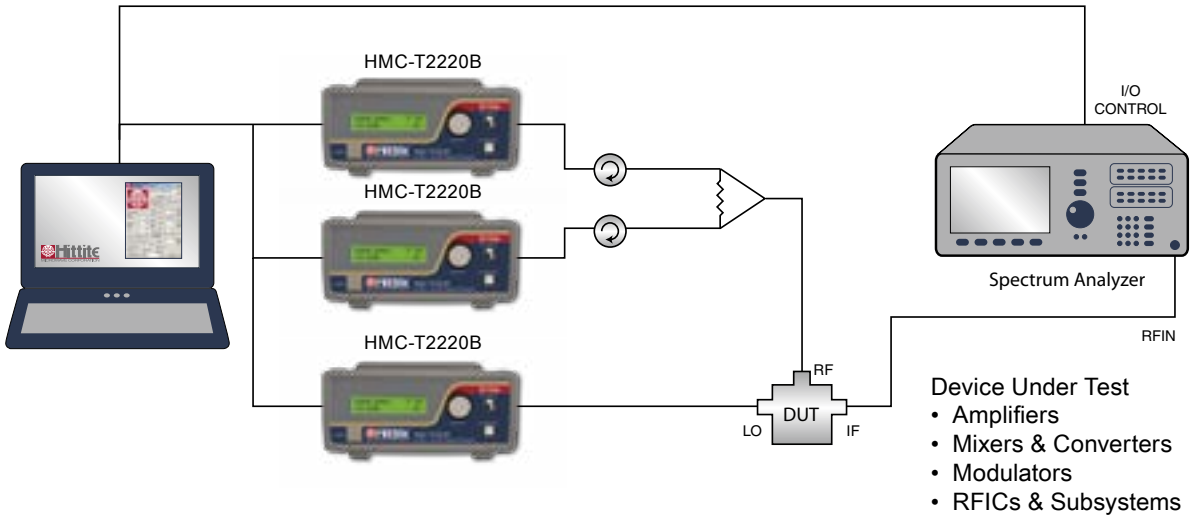
Front Panel Rotary Knob & Display

HMC-T2100 Compatibility

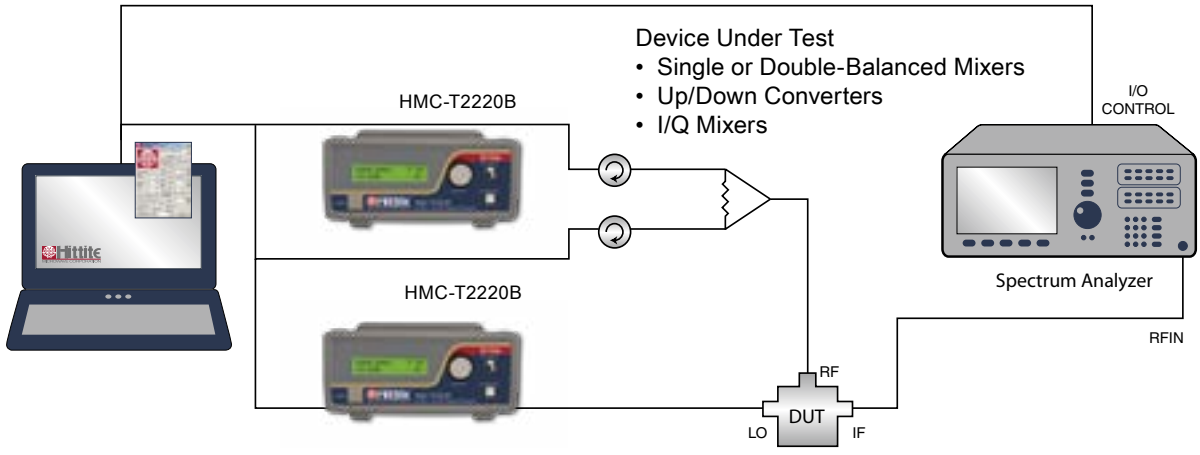
To facilitate integration into existing HMC-T2100(B) applications, the HMC-T2220B has a HMC-T2100(B) compatibility mode. In this mode, the HMC-T2220(B) identifies itself as a HMC-T2100(B) so that the HMC-T2100(B) USB drivers will work for a HMC-T2220(B) and programs which use the *IDN? string will recognize a HMC-T2220(B) as a HMC-T2100(B). Frequency resolution, maximum and minimum values for power and minimum sweep dwell time also change to match the HMC-T2100(B).

Windows® - Windows XP®, Windows Vista® and Windows 7® are registered trademarks of Microsoft Corporation.

Two Tone Third Order Intercept Test Set-up



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

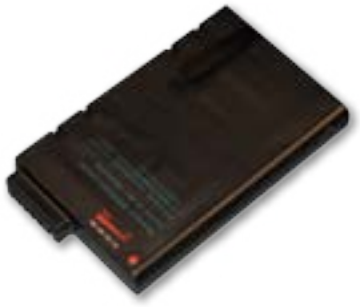


HMC-T2220B

PORTABLE SYNTHESIZED SIGNAL GENERATOR, 10 MHz to 20 GHz

v06.0216

Ordering Information



HMC-T2220B

Model Number	Description	Price
HMC-T2220B	Synthesized Signal Generator 10 MHz to 20 GHz	

Includes two rechargeable batteries, 100 - 240 V AC Power Supply and one Power Cord at no cost. Please specify your preferred power cord part number at time of ordering. (see "Power Cord" table)

Power Cord

Part Number	Region
HMC-PC01	Continental Europe
HMC-PC02	United Kingdom
HMC-PC03	China
HMC-PC04	Australia, New Zealand
HMC-PC05	North America
HMC-PC06	South Africa / India
HMC-PC07	Switzerland
HMC-PC08	Denmark
HMC-PC09	Israel
HMC-PC10	Italy
HMC-PC11	Japan

HMC-T2220B Battery

Model Number	Description	Price
HMC-T2220B-BATTERY	Lithium-Ion Battery Pack 10.8 V, 6900 mAh	

HMC-T2220B Battery Charger

Model Number	Description	Price
HMC-T2220B-CHARGER	Lithium-Ion Battery Charger	

Test Rack Mount Kit

Part Number	Description	Price
HMC-RM02	Dual Rack Mounting Plate 19" 2u Chassis	

All pricing is in U.S. Dollars and is subject to change without notice.

For price, delivery, and to place orders: Analog Devices, Inc., One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106
Phone: 781-329-4700 • Order online at www.analog.com
Application Support: Phone: 1-800-ANALOG-D