



Powertronics

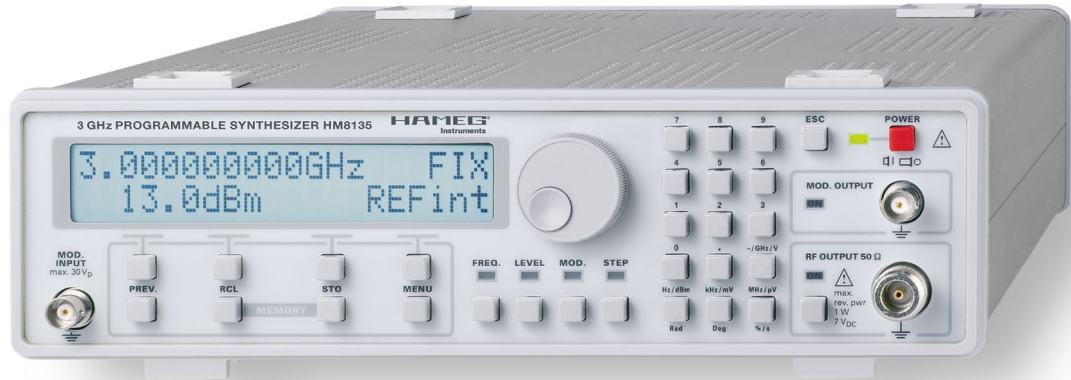
Venda, locação e manutenção.

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HAMEG® Instruments

A Rohde & Schwarz Company

3GHz RF-Synthesizer HM8135



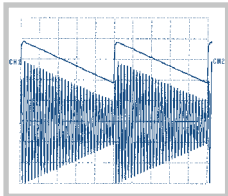
HM8135



HO880 IEEE-488
(GPIB) Interface (Option)



Internal Modulation Source



- Outstanding Frequency Range 1Hz...3GHz
- Output Power -135...+13dBm
- Frequency Resolution 1Hz (Accuracy 0.5ppm)
- Input for external Time Base (10MHz)
- Modulation Modes: AM, FM, Pulse, Φ , FSK, PSK
- Rapid Pulse Modulation: typ. 200ns
- Internal Modulator (Sine Wave, Square Wave, Triangle, Sawtooth) 10Hz...200kHz
- High spectral Purity
- 10 Configuration Memories including Turn-On Configuration
- Standard: TCXO (Temperature Stability: $\pm 0.5 \times 10^{-6}$)
Optional: OCXO (Temperature Stability: $\pm 1 \times 10^{-8}$)
- Galvanically isolated USB/RS-232 Interface,
optional IEEE-488 (GPIB)

3 GHz RF-Synthesizer HM8135

All data valid at 23 °C after 30 minutes warm-up.

Frequency

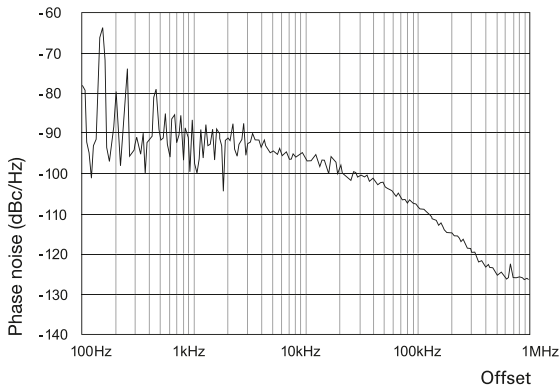
Range:	1 Hz...3 GHz
Resolution:	1 Hz
Settling time:	<10 ms

Frequency Reference 10 MHz

Standard: TCXO	
Temperature stability (0...50 °C):	≤±0.5 ppm
Aging:	≤±1 ppm/year
Option: OCXO (H085)	
Temperature stability (0...50 °C):	≤±1x 10 ⁻⁸
Aging:	≤±1x 10 ⁻⁹ /day
Internal reference output:	[rear panel]
Level:	TTL
External reference input:	[rear panel]
Level:	>0 dBm
Frequency:	10 MHz ±20 ppm

Spectral purity (without modulation)

Harmonics:	≤-35 dBc
Non-harmonics:	≤-50 dBc (>15 kHz from carrier)
Sub-harmonics:	≤-50 dBc
Phase noise:	(at 20 kHz from carrier)
f < 16 MHz:	≤-120 dBc/Hz
16 MHz ≤ f < 250 MHz:	≤-95 dBc/Hz
250 MHz ≤ f < 500 MHz:	≤-105 dBc/Hz
500 MHz ≤ f < 1000 MHz:	≤-100 dBc/Hz
1 GHz ≤ f < 2 GHz:	≤-95 dBc/Hz
2 GHz ≤ f < 3 GHz:	≤-90 dBc/Hz
Residual FM:	typ. <4 Hz; ≤6.5 Hz (in 0.3...3 kHz bandwidth)
Residual AM:	typ. <0.06 % (in 0.03...20 kHz bandwidth)



(Typical phase noise at 1 GHz)

Output level

Range:	-135...+13 dBm
Resolution:	0.1 dB
Display-Offset for ext. Attn.:	0.0...30.0 dB in 0.1 dB steps
Precision f < 1.5 GHz; level > -120 dBm	
for level > -57 dBm:	≤±0.5 dB
for level < -57 dBm:	≤±(0.5 dB + (0.2x (-57 dBm - level))/10)
Precision f > 1.5 GHz; level > -120 dBm	
for level > -57 dBm:	≤±0.7 dB
for level < -57 dBm:	≤±(0.7 dB + (0.5x (-57 dBm - level))/10)
Impedance:	50 Ω
V.S.W.R.:	f ≤ 1 GHz: ≤1.5 f > 1 GHz: ≤2.5

Modulation sources

Internal:	10 Hz...200 kHz sine wave 10 Hz...20 kHz square wave, triangle, sawtooth
Resolution:	10 Hz
External:	Input on front panel
Impedance:	10 kΩ 50 pF
Input level:	2V _{pp} for full scale
Coupling:	AC or DC
Output:	Front panel
Level:	2V _{pp}
Impedance:	1 kΩ

Amplitude modulation (Level ≤ +7 dBm)

Source:	Internal or external
AM-depth:	0...100%
Resolution:	0.1 %
Accuracy:	±4 % displayed rate ±0.5 % (AM-depth ≤ 80 %, f _{mod} ≤ 50 kHz)
Ext. frequency resp. (to -1 dB):	10 Hz...100 kHz for AC
Distortion:	<2 % (AM-depth ≤ 60 %, f _{mod} ≤ 1 kHz) <6 % (AM-depth ≤ 80 %, f _{mod} < 20 kHz)

Frequency modulation

Source:	internal or external
Deviation:	±200 Hz...400 kHz (depending on frequency band)
Resolution:	100 Hz
Accuracy:	±3 % + residual FM (f _{mod} ≤ 5 kHz) ±7 % + residual FM (5 kHz < f _{mod} < 100 kHz)
Ext. frequency response: (to -1 dB):	
DC coupling:	0...100 kHz
AC coupling:	100 Hz...100 kHz
Distortion:	<1 % for deviation ≥ 50 kHz at 1 kHz <3 % for deviation ≥ 10 kHz

Phase modulation

Source:	internal or external
Deviation:	<16 MHz: 0...3.14 rad >16 MHz: 0...10 rad
Resolution:	0.01 rad
Accuracy:	±5 % to 1 kHz + residual PM
Ext. frequency response (to -1 dB):	
DC coupling:	0...100 kHz
AC coupling:	100 Hz...100 kHz
Distortion:	<3 % for f _{mod} = 1 kHz and deviation = 10 rad

FSK modulation

Range (F0...F1):	16 MHz...3 GHz
Mode:	2 FSK levels
Data source:	external
Max. rate:	10 kbit/s
Shift (F1...F0):	0...10 MHz
Resolution:	100 Hz
Accuracy:	see under FM

PSK modulation

Mode:	2 PSK levels
Data source:	external
Max. rate:	10 kbit/s
Shift (Ph1...Ph0):	
<16 MHz:	0...±3.14 rad
>16 MHz:	0...±10 rad
Resolution:	0.01 rad
Accuracy:	see under PM

Pulse modulation

Source:	external (rear panel)
Dynamic range:	
f < 2 GHz:	>80 dB
f > 2 GHz:	>55 dB
Rise/fall times:	<50 ns (typ. <10 ns)
Delay:	<100 ns
Max. frequency:	2.5 MHz (typ. 5 MHz)
Input level:	TTL

Sweep mode

Range:	1...3000 MHz
Depth:	500 Hz...2999 MHz
Sweep time:	20 ms...5 s
Trigger:	internal

Protective functions

The synthesizer is protected against reverse power applied on RF output up to 1 W for a 50 Ω source and against any DC source up to ±7 V. The protection disconnects the output until manually reset by operator.

Miscellaneous

Interfaces:	USB/RS-232 (H0820), IEEE-488 (option)
Configuration memories:	10
Safety class:	Safety Class I (EN61010-1)
Power supply:	115...230 V ±10 %, 50/60 Hz, CAT II
Power consumption:	approx. 40 VA
Operating temperature:	+5...+40 °C
Storage temperature:	-20...+70 °C
Rel. humidity:	5...80 % (non condensing)

Dimensions (W x H x D): 285 x 75 x 365 mm
Weight: approx. 5 kg

Accessories supplied: Line cord, Operating manual

Recommended accessories:

H085	OCXO temperature stability $\pm 1 \times 10^{-8}$
H0880	IEEE-488 (GPIB) Interface (galvanically isolated)
HZ13	Interface cable (USB) 1.8m
HZ14	Interface cable (serial) 1:1
HZ20	Adapter, BNC to 4 mm banana
HZ21	Adapter plug
HZ24	Attenuator Set 50 Ω (3/6/10/20 dB)
HZ33	Test Cable 50 Ω (BNC-BNC) 0.5 m
HZ34	Test Cable 50 Ω (BNC-BNC) 1.0 m
HZ42	19" Rackmount kit 2RU
HZ72	GPIB-Cable 2m