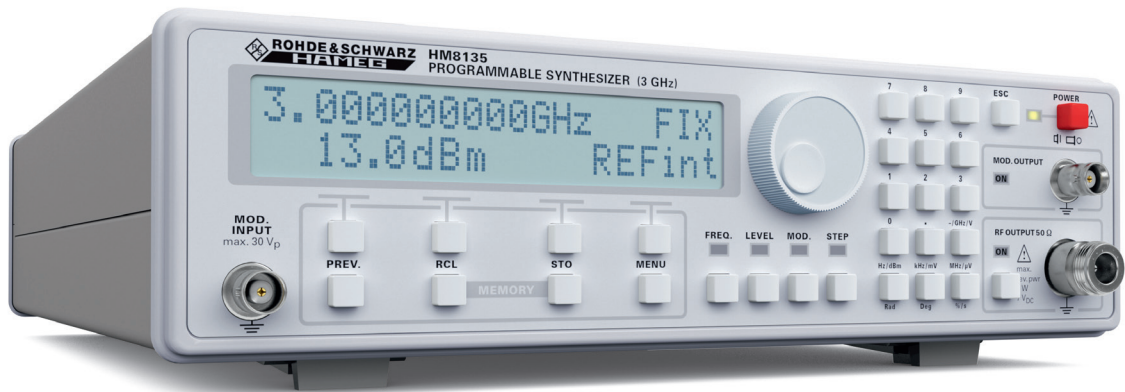


3GHz RF-Synthesizer HM8135 | HM8135-X



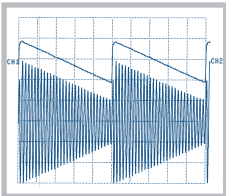
HM8135



H0880 IEEE-488 (GPIB)
Interface (option)



Internal modulation source



- ✓ Frequency range: 1 Hz to 3 GHz
- ✓ High dynamic output power: -135 dBm to +13 dBm
- ✓ Frequency resolution: 1 Hz
- ✓ High spectral purity, excellent SWEEP mode
- ✓ Modulation modes: AM, FM, pulse, phase, FSK, PSK
- ✓ Internal modulation (10 Hz to 200 kHz): sine, square, triangle, ramp
- ✓ External Ref.-Input/Output (10 MHz) via BNC-connector
- ✓ HM8135: TCXO (temperature stability: $\pm 0.5 \times 10^{-6}$)
HM8135-X: OCXO (temperature stability: $\pm 1.0 \times 10^{-8}$)
- ✓ RS-232/USB dual interface, IEEE-488 (GPIB) optional

3 GHz RF-Synthesizer HM8135

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

Frequency

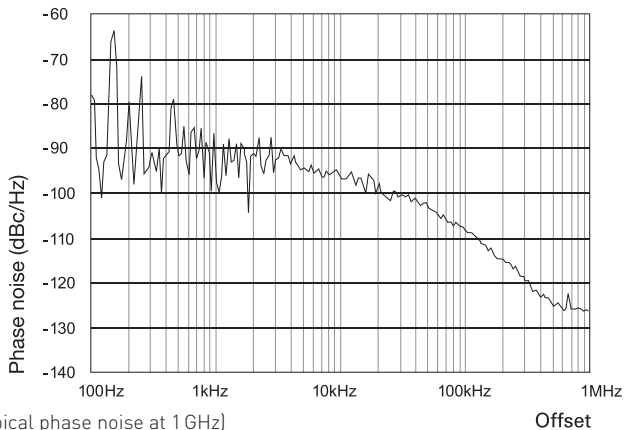
Range:	1 Hz to 3 GHz
Resolution:	1 Hz
Settling time:	<10 ms

Frequency reference 10 MHz

Standard: TCXO	
Temperature stability (0 to 50 °C)	±0.5 ppm
Aging	±1 ppm/year
Option: OCXO (H085)	
Temperature stability (0 to 50 °C)	±1 × 10 ⁻⁸
Aging	±1 × 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:	≤-30 dBc (typ. <-35 dBc)
Non-harmonics:	≤-50 dBc (>15 kHz from carrier) (from 249.95 MHz to 249.999999 MHz ≤ -35 dBc)
Sub-harmonics: <2,1 GHz	≤-50 dBc
Sub-harmonics: >2,1 GHz	≤-43 dBc (typ. -47 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 <1,000 MHz	≤-90 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 to 3 kHz bandwidth)
Residual AM:	typ. <0.06 % (in 0.03 to 20 kHz bandwidth)



Output level

Range:	-135 to +13 dBm
Resolution:	0.1 dB
Display-offset for ext. attn.:	0.0 to 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 + (0.2 × (-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 + (0.5 × (-57 dBm - level))/10)
Impedance:	50 Ω
V.S.W.R.:	f ≤500 MHz: ≤1.5 f >500 MHz: ≤2.5

Modulation sources

Internal:	
	10 Hz to 200 kHz sine wave
	10 Hz to 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 to 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 to 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 to 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 to 100 kHz
AC coupling	100 Hz to 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 to 3.14 rad >16 MHz: 0 to 10 rad
Resolution:	0.01 rad
Accuracy:	±5 % up to 1 kHz + residual PM
Ext. frequency response (to -1 dB):	
DC coupling	0 to 100 kHz
AC coupling	100 Hz to 100 kHz
Distortion:	<3 % for f _{mod} = 1 kHz and deviation = 10 rad

FSK modulation

Range (F0 to F1):	16 MHz...3 GHz
Mode:	2 FSK levels
Data source:	external
Max. rate:	10 kbit/s
Shift (F1 to F0):	0 to 10 MHz
Resolution:	100 Hz
Accuracy:	±3 % + residual FM (f _{mod} ≤5 kHz) ±7 % + residual FM (5 kHz < f _{mod} <100 kHz)

PSK modulation

Mode:	2 PSK levels
Data source:	external
Max. rate:	10 kbit/s
Shift (Ph1 to Ph0):	<16 MHz: 0 to ±3.14 rad >16 MHz: 0 to ±10 rad
Resolution:	0.01 rad
Accuracy:	±5 % up to 1 kHz + residual 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 to 3,000 MHz
Depth:	500 Hz to 2,999 MHz
Sweep time:	20 ms to 5 s
Trigger:	internal

Protective functions

The synthesizer is protected against reverse power applied to the 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:	Dual interface USB/RS-232 (H0820), IEEE-488 (GPIB) (optional)
Configuration memories:	10
Safety class:	Safety class I (EN61010-1)
Power supply:	115/230V ±10%, 50 to 60 Hz, CAT II
Power consumption:	approx. 40 VA
Operating temperature:	+5 to +40 °C
Storage temperature:	-20 to +70 °C
Rel. humidity:	5 to 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, CD

Recommended accessories:

H085	OCXO, temperature stability $\pm 1 \times 10^{-8}$ (installation only ex factory)
H0880	Interface IEEE-488 (GPIB), galvanically isolated
HZ13	Interface cable (USB) 1.8 m
HZ14	Interface cable (serial) 1:1
HZ20	Adapter, BNC to 4 mm banana
HZ21	Adapter, N male to BNC female
HZ24	Attenuators 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 2 m