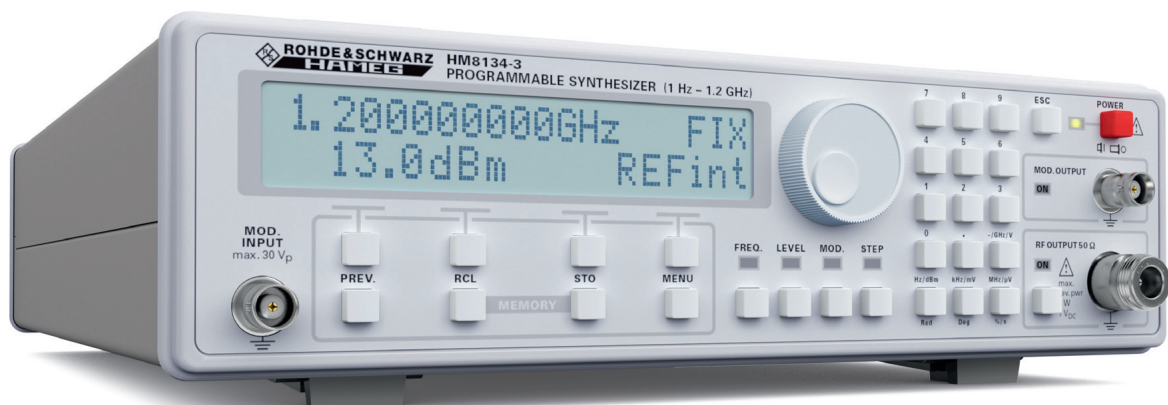


1.2 GHz RF-Synthesizer HM8134-3

HAMEG®
Instruments
A Rohde & Schwarz Company



Key facts

- Frequency range: 1 Hz to 1.2 GHz
- High dynamic output power: -127 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 150 kHz): sine, square, triangle, ramp
- External Ref.-Input/Output (10 MHz) via BNC-connector
- HM8134-3: TCXO (temperature stability: $\pm 0.5 \times 10^{-6}$)
HM8134-3X: OCXO (temperature stability: $\pm 1.0 \times 10^{-8}$)
- RS-232/USB dual interface, IEEE-488 (GPIB) optional

Technical Data

1,2 GHz HF-Synthesizer HM8134-3

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

Frequency

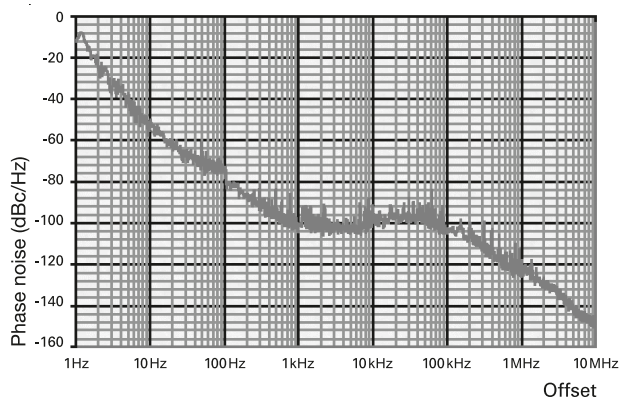
Range	1 Hz...1.200 MHz
Resolution	1 Hz
Settling time	<10 ms

Frequency Reference 10 MHz

Temperature stability	Standard TCX0; Option OCX0 (H085)	
0...50°C	≤±0,5ppm;	≤±1 x 10-8
Aging	≤±1 ppm/year;	≤±1 x 10-9/day
Internal reference output		
Level	TTL	
External reference input		
Level	>0dBm	
Frequency	10MHz ±20ppm	

Spectral purity (without modulation)

Harmonics	≤ -35 dBc
Non-harmonics	≤ -55 dBc >15 kHz from carrier)
Phase noise	(bei 20 kHz from carrier)
f <16 MHz	≤ -120 dBc/Hz
16 MHz $\leq$ f <250 MHz	≤ -94 dBc/Hz
250 MHz $\leq$ f <500 MHz	≤ -105 dBc/Hz
500 MHz $\leq$ f <1.000 MHz	≤ -100 dBc/Hz
1.000 MHz $\leq$ f <1.200 MHz	≤ -95 dBc/Hz
Residual FM	$\leq 6,5$ Hz (at 1 GHz, 0,3...3 kHz bandwidth)
Residual AM	<0,06% (0,03...20 kHz bandwidth)



Typical phase noise at 1 GHz

Output level

Range	-127...+13 dBm
Resolution	0,1 dB
Display-Offset for ext. Attn.	0,0...30,0 dB in 0,1 dB steps
Precision for level >-57 dBm for level <-57 dBm	$\leq \pm 0,5$ dB $\leq \pm (0,5 \text{ dB} + (0,2 \times (-57 \text{ dBm} - \text{level}))/10)$
Impedance	50 Ω
V.S.W.R.	≤ 2

Modulation sources

Internal	10 Hz...150 kHz 10 Hz...20 kHz	sine wave, square wave, triangle, sawtooth
Resolution	10 Hz	
External		
Impedance	10 k Ω 50 pF	

Input level	2V _{pp} for full scale
Coupling	AC or DC
Output	
Level	2V _{pp}
Impedance	1 kΩ
Amplitude modulation (Level -30...+7dBm)	
Source	internal or external
Modulation depth	0...100%
Resolution	0,1%
Accuracy	±5% @ f _{mod} 1 kHz, f>16MHz
Ext. frequency resp. (to -1 dB)	10Hz...50kHz for AC
Distortion	<2% (AM-depth ≤60%, f _{mod} ≤1 kHz) <6% (AM-depth ≤80%, f _{mod} <20kHz)
Frequency modulation	
Source	internal or external
Deviation	±200 Hz...400kHz (depending on frequency band)
Resolution	100Hz
Accuracy	±3% + res. FM (f _{mod} ≤5kHz) ±7% + res. FM (5kHz <f _{mod} <100kHz))
Ext. frequency response (to -1 dB)	
DC coupling	0...100kHz
AC coupling	10Hz...100kHz
Distortion	<1% for deviation ≥50 kHz at 1 kHz <3% for deviation ≥10kHz at 1 kHz
Phase modulation	
Source	internal or external
Deviation	<16MHz 0...3,14rad >16MHz 0...10rad
Resolution	0,01 rad
Accuracy	±5% up to 1 kHz + residual PM
Ext. frequency response (to -1 dB)	
DC coupling	0...100kHz
AC coupling	10Hz...100kHz
Distortion	<3% for fmod = 1 kHz and deviation = 10 rad
FSK modulation	
Range (F0...F1)	16...1.200MHz
Mode	2 FSK levels
Data source	external
Max. rate	10kbit/s
Shift (F1...F0)	0...10MHz
Resolution	100Hz
Accuracy	±3% + residual FM (f _{mod} ≤5kHz) ±7% + residual FM (5kHz <f _{mod} <100kHz)
PSK modulation	
Mode	2 PSK levels
Data source	external
Max. rate	10kbit/s
Shift (Ph1...Ph0)	<16MHz 0...±3,14rad >16MHz 0...±10rad
Resolution	0,01 rad
Accuracy	±5% up to 1 kHz + residual PM
Pulse modulation	
Source	external
Dynamic range	>80dB
Rise/fall times	<50ns
Delay	<100ns
Max. frequency	2,5MHz

Input level	TTL
Sweep mode	
Range	1...1.200 MHz
Depth	500 Hz...1.199 MHz
Sweep time	20 ms...5 s
Trigger	intern
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	
Interface	Dual-Interface USB/RS-232 (HO820), IEEE-488 (GPIB) (optional)
Configuration memories	10
Safety class	Safety Class I (EN61010-1)
Power supply	115/230 V $\pm 10\%$, 50...60 Hz, CAT II
Power consumption	ca. 40 VA
Operating temperature	+5...+40 $^{\circ}\text{C}$
Storage temperature	-20...+70 $^{\circ}\text{C}$
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, CD

Recommended accessories:

HO85 OCXO, temperature stability $\pm 1 \times 10^{-8}$ (Installation only ex factory)
HO880 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