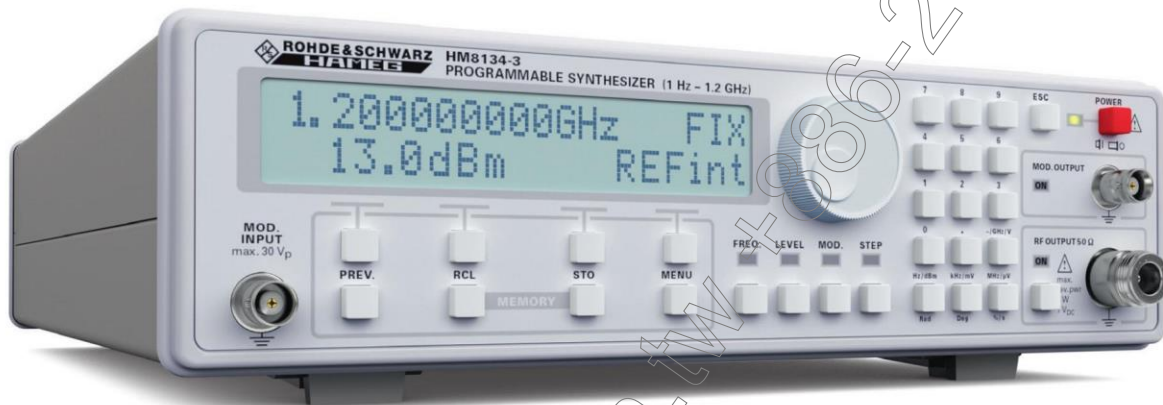


HM8134-3, HM8134-3X 1.2 GHz RF-Synthesizer Technical Data

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

 **ROHDE & SCHWARZ**

Test & Measurement

Technical Data

PD 5210.8708.32 - 01.00

宥億企業股份有限公司 YO IE ENTERPRISE CORP., LTD

Tel : +886-2-7746-3368

Fax : +886-2-3322-4068

地址:100台北市中正區忠孝東路1段85號12樓之二

E-mail: sales@yoie.com.tw

Web : www.yoie.com.tw

Add:12F.-2, No.85, Sec. 1, Zhongxiao E. Rd., Zhongzheng Dist., Taipei City, Taiwan



Technical Data

1,2GHz HF-Synthesizer HM8134-3

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

Frequency

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

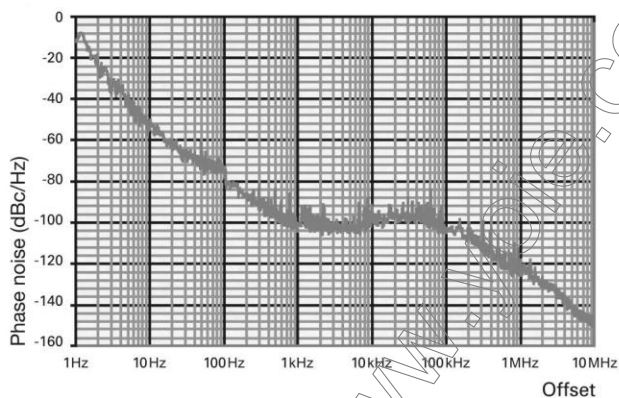
Frequency Reference 10MHz

Temperature stability	TCXO (HM8134-3)	OCXO (HM8134-3X)
0...50°C	$\leq \pm 0.5 \times 10^{-6}$	$\leq \pm 1 \times 10^{-8}$
Aging	$\leq \pm 1 \times 10^{-6}/\text{year}$	$\leq \pm 1 \times 10^{-9}/\text{day}$

Internal reference output		
Level	TTL	
External reference input		
Level	>0dBm	
Frequency	10MHz ± 20 ppm	

Spectral purity (without modulation)

Harmonics	≤ -35 dBc
Non-harmonics	≤ -55 dBc >15kHz from carrier)
Phase noise	(bei 20kHz from carrier)
f < 16MHz	≤ -120 dBc/Hz
16MHz \leq f < 250MHz	≤ -94 dBc/Hz
250MHz \leq f < 500MHz	≤ -105 dBc/Hz
500MHz \leq f < 1.000MHz	≤ -100 dBc/Hz
1.000MHz \leq f < 1.200MHz	≤ -95 dBc/Hz
Residual FM	≤ 6.5 Hz (at 1GHz, 0.3...3kHz bandwidth)
Residual AM	<0.06% (0.03...20kHz bandwidth)



Typical phase noise at 1 GHz

Output level

Range	-127...+13dBm
Resolution	0,1 dB
Display-Offset for ext. Attn.	0,0...30,0 dB in 0,1 dB steps
Precision for level > -57 dBm	± 0.5 dB
for level ≤ -57 dBm	$\pm (0.5 \text{ dB} + (0.2 \times (-57 \text{ dBm} - \text{level}))/10)$
Impedance	50 Ω
V.S.W.R.	≤ 2

Modulation sources

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

Input level	2V _{pp} for full scale
Coupling	AC or DC
Output	
Level	2V _{pp}
Impedance	1k Ω
Amplitude modulation (Level -30...+7dBm)	
Source	internal or external
Modulation depth	0...100%
Resolution	0,1%
Accuracy	$\pm 5\%$ @ f _{mod} 1 kHz, f > 16 MHz
Ext. frequency resp. (to -1 dB)	10 Hz...50 kHz for AC
Distortion	<2% (AM-depth $\leq 60\%$, f _{mod} ≤ 1 kHz) <6% (AM-depth $\leq 80\%$, f _{mod} < 20 kHz)
Frequency modulation	
Source	internal or external
Deviation	± 200 Hz...400 kHz (depending on frequency band)
Resolution	100 Hz
Accuracy	$\pm 3\%$ + res. FM (f _{mod} ≤ 5 kHz) $\pm 7\%$ + res. FM (5 kHz < f _{mod} < 100 kHz)
Ext. frequency response (to -1 dB)	
DC coupling	0...100 kHz
AC coupling	10 Hz...100 kHz
Distortion	<1% for deviation ≥ 50 kHz at 1 kHz <3% for deviation ≥ 10 kHz at 1 kHz
Phase modulation	
Source	internal or external
Deviation	<16 MHz: 0...3,14 rad >16 MHz: 0...10 rad
Resolution	0,01 rad
Accuracy	$\pm 5\%$ up to 1 kHz + residual PM
Ext. frequency response (to -1 dB)	
DC coupling	0...100 kHz
AC coupling	10 Hz...100 kHz
Distortion	<3% for f _{mod} = 1 kHz and deviation = 10 rad
FSK modulation	
Range (F0...F1)	16...1.200 MHz
Mode	2 FSK levels
Data source	external
Max. rate	10 kbit/s
Shift (F1...F0)	0...10 MHz
Resolution	100 Hz
Accuracy	$\pm 3\%$ + residual FM (f _{mod} ≤ 5 kHz) $\pm 7\%$ + residual FM (5 kHz < f _{mod} < 100 kHz)
PSK modulation	
Mode	2 PSK levels
Data source	external
Max. rate	10 kbit/s
Shift (Ph1...Ph0)	<16 MHz: 0... $\pm 3,14$ rad >16 MHz: 0... ± 10 rad
Resolution	0,01 rad
Accuracy	$\pm 5\%$ up to 1 kHz + residual PM
Pulse modulation	
Source	external
Dynamic range	>80 dB
Rise/fall times	<50 ns
Delay	<100 ns
Max. frequency	2.5 MHz



Input level	TTL
Sweep mode	
Range	1...1.200MHz
Depth	500 Hz...1.199MHz
Sweep time	20ms...5s
Trigger	intern
Protective functions	
The synthesizer is protected against reverse power applied to the RF output up to 1W for a 50Ω source and against any DC source up to ±7V. 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	115/230V ±10%, 50...60Hz, CAT II
Power consumption	ca. 40VA
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 365mm
Weight	approx. 5 kg

Accessories supplied: Line cord, Operating manual, CD

Recommended accessories:

- HO880 Interface IEEE-488 (GPIB), galvanically isolated
- HZ13 Interface cable (USB) 1.8m
- HZ14 Interface cable (serial) 1:1
- HZ20 Adapter, BNC to 4 mm banana
- HZ21 Adapter, N male to BNC female
- HZ24 Attenuators 50Ω (3/6/10/20 dB)
- HZ33 Test cable 50Ω, BNC/BNC, 0.5 m
- HZ34 Test cable 50Ω, BNC/BNC, 1.0 m
- HZ42 19" Rackmount kit 2RU
- HZ72 GPIB-Cable 2m

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地址:100台北市中正區忠孝東路1段85號12樓之二

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