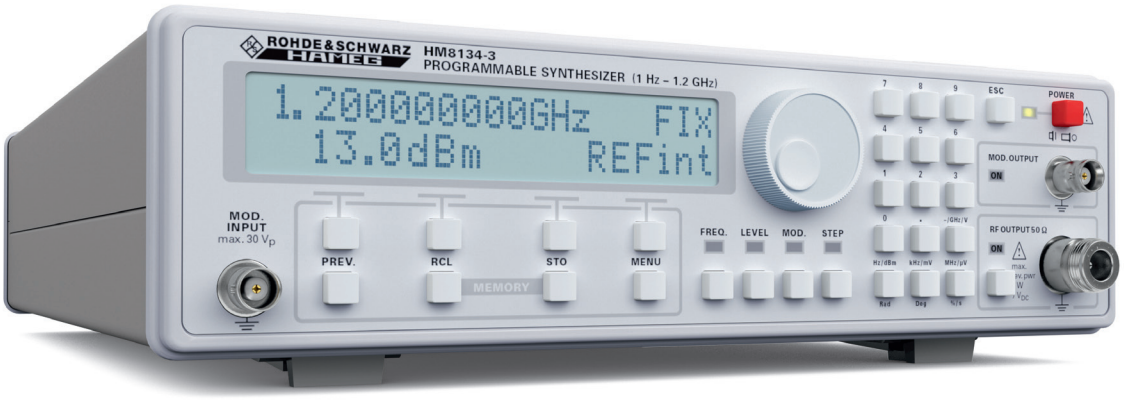
HAMEG Instruments
A Rohde&Schwarz Company

1.2GHz RF-Synthesizer
HM8134-3 | HM8134-3X

HM8134-3



RS-232 | USB | optional IEEE-488 | Lab-VIEW | Printed Manual

HZ42
19" Rackmount Kit 2RU

HO880 IEEE-488 (GPIB)
Interface (option)

- ☑ 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

1.2 GHz RF-Synthesizer HM8134 | HM8134-3X

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

Frequency

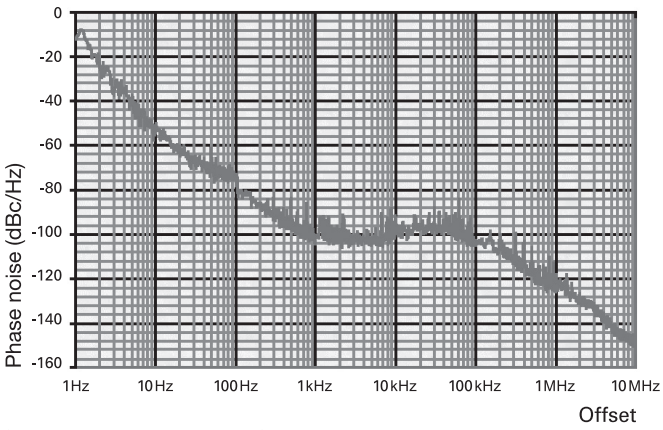
Range:	1 Hz to 1,2 GHz
Resolution:	1 Hz
Settling time:	<10 ms

Frequency reference 10 MHz

HM8134-3 (TCXO):	
Temperature stability (0 to 50 °C)	≤±0.5 x 10^{-6}
Aging	≤±1.0 x 10^{-6}/year
HM8134-3X (OCXO):	
Temperature stability (0 to 50 °C)	≤±1.0 x 10^{-8}
Aging	≤±1.0 x 10^{-9}/day
Internal reference output:	(rear panel)
Level	TTL
External reference input:	(rear panel)
Level	>0 dBm
Frequency	10 MHz ±20 x 10^{-6}

Spectral purity (without modulation)

Harmonics:	≤-35 dBc
Non-harmonics:	≤-55 dBc (>15 kHz from carrier)
Phase noise:	(at 20kHz from carrier)
f <16 MHz	≤-120dBc/Hz
16 MHz ≤f <250 MHz	≤-94 dBc/Hz
250 MHz ≤f <500 MHz	≤-105 dBc/Hz
500 MHz ≤f <1 GHz	≤-100 dBc/Hz
1 GHz ≤f <1.2 GHz	≤-95 dBc/Hz
Residual FM:	≤6.5 Hz (at 1 GHz in 0.3 to 3 kHz bandwidth)
Residual AM:	typ. <0.06 % (in 0.03 to 20 kHz bandwidth)



(Typical phase noise at 1 GHz)

Output level

Range:	-127 to +13 dBm
Resolution:	0.1 dB
Display-offset for ext. attn.:	0.0 to 30.0 dB in 0.1 dB steps
Precision:	
for level >-57 dBm	≤±0.5 dB
for level <-57 dBm	≤±(0.5 dB + (0.2 x (-57 dBm - level))/10)
Impedance:	50 Ω
V.S.W.R.:	≤2

Modulation sources

Internal:	10 Hz to 150 kHz sine wave, 10 Hz to 20 kHz square wave, triangle, ramp
Resolution	10 Hz
External:	(input on front panel)
Impedance	10 kΩ II 50 pF
Input level	2 V_{pp} for full scale
Coupling	AC or DC
Output:	(on front panel)
Level	2 V_{pp}
Impedance	1 kΩ

Amplitude modulation (Level ≤ +7 dBm)

Source:	internal or external
Modulation depth:	0 to 100 %
Resolution:	0.1 %
Accuracy:	±4 % of reading ±0.5 % (AM-depth ≤80 %, f_{mod} ≤40 kHz)
Ext. frequency resp. (to -1 dB):	10 Hz to 50 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 % + res. FM (f_{mod} ≤5 kHz) ±7 % + res. FM (5 kHz <f_{mod} <100 kHz)
Ext. frequency response (to -1 dB):	
DC coupling	0 to 100 kHz
AC coupling	10 Hz to 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 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	10 Hz to 100 kHz
Distortion:	<3 % for f_{mod} = 1 kHz and deviation = 10 rad

FSK modulation

Range (F0 to F1):	16 MHz to 1.2 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:	>80 dB
Rise/fall times:	<50 ns
Delay:	<100 ns
Max. frequency:	2.5 MHz
Input level:	TTL

Sweep mode

Range:	1 MHz to 1.2 GHz
Depth:	500 Hz to 1.199 GHz
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 ±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:	115/230 V ±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, printed Operating manual, CD

Recommended accessories:

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

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