

3 GHz RF Synthesizer HM8135

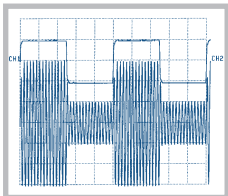
3rd Quarter
2006



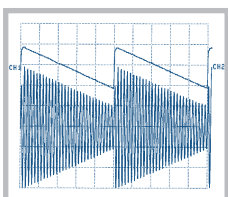
H0870 USB Interface



Internal modulation source



Internal modulation source



Frequency range from 1 Hz to 3 GHz

Output power from -135 dBm to +13 dBm

Frequency resolution 1 Hz (accuracy 0.5 ppm)

Input for external time base (10 MHz)

Modulation modes: AM, FM, Puls, Φ , FSK, PSK

Rapid pulse modulation: typ. 200 ns

Internal modulator 10 Hz to 200 kHz

High spectral purity

OCXO optional

RS-232 interface, optional: USB, IEEE-488



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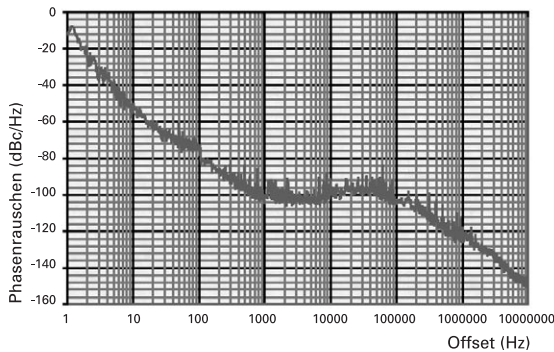
Valid at 23 °C after a 30 minute warm-up period

Frequency

Range:	1 Hz to 3 GHz
Resolution:	1 Hz
Settling time:	< 10 ms
10 MHz reference (internal)	
Stability:	$\leq \pm 1 \times 10^{-8}$ (0 to + 50 °C)
Aging:	$\leq \pm 5 \times 10^{-9}$ /year
Output (rear panel):	
Level:	TTL
Input (rear panel):	
Level:	> 0 dBm;
Frequency:	10 MHz

Spectral purity (without modulation)

Harmonic:	≤ -35 dBc (typ.)
Non-harmonic:	≤ -60 dBc (> 15 kHz from carrier)
Sub-harmonic:	≤ -50 dBc (typ.)
Phase noise: (at 20 kHz from carrier)	
< 16 MHz:	≤ -120 dBc/Hz
16 to 250 MHz:	≤ -95 dBc/Hz
250 to 500 MHz:	≤ -105 dBc/Hz
500 to 1000 MHz:	≤ -100 dBc/Hz
1 to 2 GHz:	≤ -95 dBc/Hz
2 to 3 GHz:	≤ -90 dBc/Hz



(Typical phase noise at 1 GHz)

Output level

Range:	-135 to +13 dBm
Resolution:	0.1 dB
Precision:	$\leq \pm 0.5$ dB (for level > -57 dBm)
Impedance:	50 Ω
V.S.W.R.:	$\leq 1 : 2$

Modulation sources

Internal:	
	10 Hz - 200 kHz sine wave
	10 Hz - 20 kHz square wave, triangle, saw thooth
Resolution:	
	10 Hz
External:	
	(input on front panel)
Impedance:	
	10 k Ω
Input level:	
	2 V_{rms} for full scale
Coupling:	
	AC or DC
Output:	
	front panel
Level:	
	2 V_{rms}
Impedance:	
	1 k Ω

Amplitude modulation [Level $\leq +7$ dBm]

Source:	internal or external
AM-depth:	0 to 100 %
Resolution:	0.1 %
Accuracy:	± 4 % of reading ± 0.5 % (AM depth ≤ 80 %, $f_{mod} \leq 1$ kHz)
Ext. frequency resp. (to - 1 dB):	10 Hz to 100 kHz for AC
Distortion:	< 2 % (AM-depth ≤ 60 %, $f_{mod} \leq 1$ kHz) < 6 % (AM-depth ≤ 80 %, f_{mod} : 10 Hz to 100 kHz)

Frequency modulation

Source:	internal or external
Deviation:	± 200 Hz to 400 kHz (depending on frequency band)

Resolution:	100 Hz
Accuracy:	± 3 % + residual FM ($f_{mod} \leq 5$ kHz) ± 7 % + residual FM ($f_{mod} > 5$ kHz)
Ext. frequency response: (to - 1 dB):	
DC coupling:	0 to 100 kHz
AC coupling:	10 Hz to 100 kHz
Distortion:	< 3 % for deviation ≥ 10 kHz at 1 kHz

Phase modulation

Source:	internal or external
Deviation:	0 to 3.14 rad (< 16 MHz) 0 to 10 rad (> 16 MHz)
Resolution:	0.01 rad
Accuracy:	± 5 % 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 - F1):	16 to 3000 MHz
Mode:	2 FSK levels
Data source:	external
Max. rate:	10 kbit/s
Shift (F1 - F0):	0 to 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):	< 20 MHz: 0 to ± 3.14 rad > 20 MHz: 0 to ± 10 rad
Resolution:	0.01 rad
Accuracy:	see under PM

Pulse modulation

Source:	external (rear panel)
Dynamic range:	> 60 dB
Rise/fall times:	< 200 ns
Delay:	< 100 ns
Max. frequency:	2.5 MHz
Input level:	TTL

Sweep mode

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

Protective functions

The synthesiser 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 rearmed by operator.

Miscellaneous

Interfaces:	RS-232, 9-pole D-sub
Configuration memories:	10
Safety class:	Safety Class I (EN61010-1)
Power supply:	115/230 V ± 10 %, 50/60 Hz
Power consumption:	approx. 40 VA
Operating temperature:	+ 10 to + 40 °C
Max. relative humidity:	10 to 90 % (without condensation)
Dimensions (W x H x D):	285 x 75 x 365 mm
Weight:	approx. 5 kg

Accessories supplied: Operator's manual, power cable

Optional accessories:

HZ33/HZ34 Test Cable 50 Ω (BNC-BNC)
HZ21 Adapter plug
HZ42 19" Rackmount kit 2RU
HO870 USB Interface,
HO880 IEEE-488 interface
HO890 RS-232 Interface