



ABN 43 064 478 842

231 Osborne Avenue Clayton South, VIC 3169  
PO Box 1548, Clayton South, VIC 3169  
t 03 9265 7400 f 03 9558 0875  
freecall 1800 680 680  
www.tmgtestequipment.com.au

## Test & Measurement

- > sales
- > rentals
- > calibration
- > repair
- > disposal

## Complimentary Reference Material

This PDF has been made available as a complimentary service for you to assist in evaluating this model for your testing requirements.

TMG offers a wide range of test equipment solutions, from renting short to long term, buying refurbished and purchasing new. Financing options, such as Financial Rental, and Leasing are also available on application.

TMG will assist if you are unsure whether this model will suit your requirements.

Call TMG if you need to organise repair and/or calibrate your unit.

If you click on the "Click-to-Call" logo below, you can call us for FREE!

TMG Corporate Website

TMG Products Website



Click-to-Call  
TMG Now



Product Lifecycle Management System

### Disclaimer:

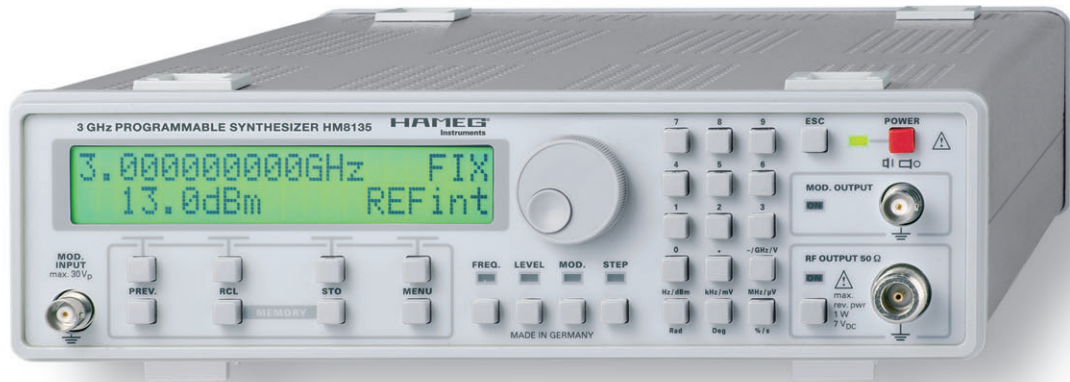
All trademarks appearing within this PDF are trademarks of their respective owners.





## 3 GHz RF-Synthesizer HM8135

HM8135



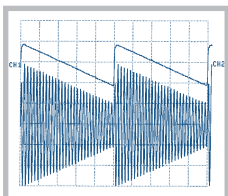
H0870 USB Interface



H0880 IEEE-488 (GPIB) Interface



Internal modulation source



Outstanding 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, Pulse,  $\Phi$ , FSK, PSK

Rapid pulse modulation: typ. 200 ns

Internal modulator (sine wave, square wave, triangle, sawtooth)  
from 10 Hz to 200 kHz

High spectral purity

Standard: TCXO (temperature stability:  $\pm 0,5 \times 10^{-6}$ )

Optional: OCXO (temperature stability:  $\pm 1 \times 10^{-8}$ )

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

10 configuration memories including turn-on configuration

## 3 GHz RF-Synthesizer HM8135

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

Frequency	
Range:	1 Hz bis 3 GHz
Resolution:	1 Hz
Settling time:	< 10 ms
Frequency Reference 10 MHz	
Standard: TCXO	
Temperature stability (0 to 50°C): $\leq \pm 0,5$ ppm	
Aging: $\leq \pm 1$ ppm/year	
Option: OCXO (Type HM8135X)	
Temperature stability (0 to 50 °C): $\leq \pm 1 \times 10^{-9}$	
Aging: $\leq \pm 1 \times 10^{-7}$ /day	
Internal reference output: (rear panel)	
Level: TTL	
External reference input: (rear panel)	
Level: > 0 dBm	
Frequency: 10 MHz $\pm$ 20 ppm	
Spectral purity (without modulation)	
Harmonics:	$\leq -35$ dBc (typ.)
Non-harmonics:	$\leq -50$ dBc (> 15 kHz from carrier)
Sub-harmonics:	$\leq -50$ dBc (typ.)
Phase noise:	(at 20 kHz from carrier)
f < 16 MHz:	$\leq -120$ dBc/Hz
16 MHz $\leq$ f < 250 MHz:	$\leq -95$ dBc/Hz
250 MHz $\leq$ f < 500 MHz:	$\leq -105$ dBc/Hz
500 MHz $\leq$ f < 1000 MHz:	$\leq -100$ dBc/Hz
1 GHz $\leq$ f < 2 GHz:	$\leq -95$ dBc/Hz
2 GHz $\leq$ f < 3 GHz:	$\leq -90$ dBc/Hz
Residual FM:	typ. < 4 Hz; $\leq 6,5$ Hz (in 0.3 – 3 kHz bandwidth)
Residual AM:	typ. < 0.06 % (in 0.03 – 20 kHz bandwidth)

(Typical phase noise at 1 GHz)

Output level	
Range:	-135 to +13 dBm
Resolution:	0.1 dB
Precision f < 1.5 GHz; level > -120 dBm	
for level > -57 dBm:	$\leq \pm 0,5$ dB
for level < -57 dBm:	$\leq \pm [0,5 \text{ dB} + (0,2 \times (-57 \text{ dBm} - \text{level}))/10]$
Precision f > 1.5 GHz; level > -120 dBm	
for level > -57 dBm:	$\leq \pm 0,7$ dB
for level < -57 dBm:	$\leq \pm [0,7 \text{ dB} + (0,5 \times (-57 \text{ dBm} - \text{level}))/10]$
Impedance:	50 $\Omega$
V.S.W.R.:	f $\leq$ 1 GHz: $\leq 1,5$ f > 1 GHz: $\leq 2,5$
Modulation sources	
Internal:	
10 Hz – 200 kHz sine wave	
10 Hz – 20 kHz square wave, triangle, sawtooth	
Resolution: 10 Hz	
External: (input on front panel)	
Impedance:	10 k $\Omega$    50 pF
Input level:	2 V <sub>pp</sub> for full scale
Coupling:	AC or DC
Output: front panel	
Level:	2 V <sub>pp</sub>
Impedance:	1 k $\Omega$
Amplitude modulation (Level $\leq$ +7 dBm)	
Source:	internal or external
AM-depth:	0 to 100 %
Resolution:	0.1 %

Accuracy:	$\pm 4$ % displayed rate $\pm 0,5$ % (AM-depth $\leq 80$ %, fmod $\leq 50$ kHz)
Ext. frequency resp. (to -1dB):	10 Hz to 100 kHz for AC
Distortion:	< 2 % (AM-depth $\leq 60$ %, fmod $\leq 1$ kHz) < 6 % (AM-depth $\leq 80$ %, fmod < 20 kHz)
Frequency modulation	
Source:	internal or external
Deviation:	$\pm 200$ Hz to 400 kHz (depending on frequency band)
Resolution:	100 Hz
Accuracy:	$\pm 3$ % + residual FM (fmod $\leq 5$ kHz) $\pm 7$ % + residual FM (5 kHz < fmod < 100 kHz)
Ext. frequency response: (to -1dB):	
DC coupling:	0 to 100 kHz
AC coupling:	100 Hz to 100 kHz
Distortion:	< 1 % for deviation $\geq 50$ kHz at 1 kHz < 3 % for deviation $\geq 10$ 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:	$\pm 5$ % to 1 kHz + residual PM
Ext. frequency response (to -1dB):	
DC coupling:	0 to 100 kHz
AC coupling:	100 Hz to 100 kHz
Distortion:	< 3 % for fmod = 1 kHz and deviation = 10 rad
FSK modulation	
Range (F0 – F1):	16 MHz to 3 GHz
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):	
< 16 MHz:	0 to $\pm 3,14$ rad
> 16 MHz:	0 to $\pm 10$ rad
Resolution:	0.01 rad
Accuracy:	see under 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 MHz to 3000 MHz
Depth:	500 Hz to 2999 MHz
Sweep time:	20 ms to 5 s
Trigger:	internal
Protective functions	
The synthesizer is protected against reverse power applied on RF output up to 1 W for a 50 $\Omega$ source and against any DC source up to $\pm 7$ V. The protection disconnects the output until manually rearmed by operator.	
Miscellaneous	
Interfaces:	RS-232 (standard), IEEE-488 (optional), USB (optional)
Configuration memories:	10
Safety class:	Safety Class I (EN61010-1)
Power supply:	115/230V $\pm 10$ %, 50/60Hz
Power consumption:	approx. 40 VA
Operating temperature:	0 to +50 °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 $\Omega$ (BNC-BNC), HZ21 Adapter plug, HZ42 19" Rackmount kit 2RU, H0870 USB Interface, H0880 IEEE-488 (GPIB) Interface, H0890 RS-232 Interface, OCXO (Type HM8135X)	

www.hameg.com