RF-Synthesizer HM8134-2

- **Programmable RF-Signal Source, 1Hz Resolution**
- **Frequency Range 1Hz to 1200MHz**
- **Frequency Accuracy ±5x10^{-7} (optional ±5x10^{-8})**
- **AM/FM/PM/GATE/FSK/PSK Modulation**
- **RS-232 interface included as standard**
- **Optional IEEE-488 Interface**

Precision RF Source for Laboratory and Service

The **HM8134-2** is an exceptionally low priced Programmable, RF Synthesizer combining high performance with fast and easy operation. It has excellent basic specifications, including such characteristics as high frequency stability, fast frequency change response time, spectral purity, and repeatable signal output levels.

The **HM8134-2** provides continuous frequency selectable from as low as **1Hz** up to **1.2GHz**, with optional gated mode. This wide range covers the most commonly needed spectrum of audio, video, and IF frequencies, as well as the RF frequencies used by receivers and transmitters in a wide variety of communication systems. The frequency resolution of 1Hz allows convenient incremental settings in narrow band systems. Output power is +13dBm.

The instrument offers amplitude, frequency, phase and gated modulation. Internally generated sine, square, triangle and ramp signals are available for internal **AM/FM/PM/GATE/FSK** and **PSK** modes over a wide frequency range. External inputs allow modulation between **10Hz** and **100kHz**. The FM deviation may be varied up to **±400kHz**. Amplitude modulation depth is variable from 0 to 100%. The fast response time of **10ms** for frequency and amplitude changes is another outstanding characteristic of this instrument.

The generator frequency, output level, and modulation parameters are all clearly displayed on a **LCD** providing all relevant information at a glance. The **HM8134-2** was designed with the thought of operational ease and productivity in mind.

Menu driven operation gives clear, up front information at every stage. Parameters are either set via the **rotary dial** or by the front panel keypad. A maximum of **ten** frequently used instrument settings can be stored in a non-volatile memory.

Full programmability for use in automated test systems is provided by the optional **IEEE-488** (HO88-2) interface. One of these options either can be factory installed at the time of purchase, or can easily be added by the user.

With the **HM8134-2**, **HAMEG** offers a price/performance ratio unsurpassed in today's market. As already successfully demonstrated in its oscilloscope and Modular System HM8000 series, **HAMEG** has again reached its goal of cost effective, high quality instrumentation by concentrating on essentials, keeping operation simple without omitting important functions.

230403

Specifications HM8134-2

(Ref. temperature :23°C ±2°C)

Frequency

Range: 1Hz to 1200MHz
Resolution: 1Hz
Settling Time: < 10ms (if same range)
< 60ms (range to range)

Standard 10MHz

Stability (10 to 40°C): ≤ ±0.5ppm
Aging: ≤ ±1ppm/year

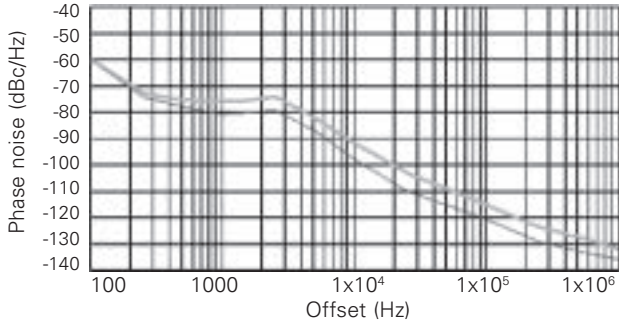
Option OCXO 10MHz - Art. Nr.: 15-8134-020C

Stability (10 to 40°C): ≤ ± 0.05ppm
Aging: ≤ ± 0.005/day
Output Reference Internal: (BNC socket on back panel)
Output Voltage: TTL
Input Reference External: (BNC socket on back panel)
Input Frequency: 10MHz ±5ppm
Input Level: > 0dBm

Spectral Purity

without modulation, level ≤ +10dBm
Harmonic: 1Hz to 1200MHz -30dBc
Non harmonic: 16MHz to 500MHz -55dBc (> 15kHz offset)
Residual FM: < 50Hz RMS to 1GHz (0.3-3kHz BW)
Residual PM: <0.06rad RMS to 1GHz (0.3-3kHz BW)
Residual AM: < 0.1% (50Hz to 10kHz)
Phase Noise (dBc/Hz):

	Offset		
Range	1kHz	10kHz	100kHz
<16MHz	-82	-100	-121
16 - 256MHz	-74	-84	-108
256 - 512MHz	-80	-90	-115
512 -1200MHz	-74	-84	-108



Output Level

Range: -127dBm to +13dBm
Resolution: 0.1dB
Accuracy: ± 0.5dBm level > -57dBm, ±(1dBm+0.4dBm/10dB)level < -57dBm
Settling Time: < 10ms (with modulation)
< 60ms (without modulation)
Impedance: 50Ω
V.S.W.R.: <1.5

Modulation Source

Modulation Source Int: 10Hz to 100kHz (40kHz in AM) Sine
10Hz to 20kHz Sqr, Tri, Rmp+, Rmp-
Resolution: 10Hz
Input Modulation Ext: (BNC socket on front panel)
Input Impedance: 10kΩ
Input Voltage: the modulation is calibrated with 2Vpp
Output Source (int, ext): (BNC socket on front panel)
Output Voltage: ± 2V

Amplitude Modulation

Level: ≤ +7dBm
Modulation Source: internal, external
AM-Depth: 0 to 100%
Resolution: 0.1%
Accuracy (internal sine): ±4% of reading ±0.5% of value
(AM-depth ≤ 80% , Fmod ≤ 1kHz)
±7% of reading ±0.5% of value (AM-depth ≤ 80% , Fmod > 1kHz)
Bandwidth ext (1dB): 10Hz-50kHz, AC coupled
Distortion: <2% (AM-depth ≤ 60% to 1kHz)
<6% (AM-depth ≤ 80% , level = +7dBm 10Hz to 20kHz)

Frequency Modulation

Modulation Source: internal, external
Deviation: ±200Hz to ±150kHz (<16MHz), ± 2kHz to ±400kHz (16 -256MHz)
± 1kHz to ±200kHz (256 -512MHz), ± 2kHz to ±400kHz (512 -1200MHz)
Resolution: 100Hz
Accuracy (internal sine): ±2% Fmod ≤ 1kHz + residual FM
±5% Fmod > 1kHz + residual FM
Bandwidth ext. (1dB):
DC coupled: DC- 30kHz (100kHz<16MHz)
AC coupled: 10Hz- 30kHz(100kHz <16MHz), 30kHz-100kHz
Distortion: < 3% for deviations > 10kHz

FSK Modulation (Frequency Shift Keying)

Range: 16MHz to 1200MHz
Mode: 2 FSK levels
Data source: External
Shift (F1-F0): 0 to 10MHz
Resolution: 100Hz
Accuracy: idem FM (Frequency modulation) deviation

PSK Modulation (Frequency Shift Keying)

Range: 1Hz to 1200MHz
Mode: 2 PSK levels
Data source: External
Shift (PH1-PH0): -3.14 rad to 3.14 rad (< 16MHz)
-10 rad to 10 rad (16 to 1200MHz)
Resolution: 0.01 rad
Accuracy: idem PM (Phase modulation) deviation

Phase Modulation

Modulation Source: internal, external
Deviation: 0 to 3.14rad (<16MHz), 0 to 10rad (16 - 1200MHz)
Resolution: 0.01rad
Accuracy (internal sine): ±5% to 1kHz + residual-PM
Bandwidth ext (1dB):
DC coupled: NUM DC- 30kHz (100kHz <16MHz)
AC coupled: NUM 10Hz- 30kHz (100kHz <16MHz)
ANA 30kHz-100kHz
Distortion: < 3% for Fmod=1kHz, Deviation=10rad

Sweep

Range: 16MHz to 1200MHz
Modulation depth: 500Hz to 1184MHz
Resolution: 1Hz
Modulation source: Internal
Mode: Linear
Duration: 20ns to 5s, continuous
Resolution: 10ms

Gated Mode

Gate Source: external
on/off Ratio: ≥ 65dB (<16MHz), ≥ 80dB (16MHz - 512MHz)
≥ 50dB (512MHz -1024MHz), ≥ 45dB (1024MHz -1200MHz)
Rise/Fall Time: ≤ 1.5µs (<16MHz), ≤ 7.5µs (16MHz -1024MHz)
Delay Time: ≤ 1.5µs (<16MHz), ≤ 15µs (16MHz -1024MHz)
Input Modulation: (BNC socket on back panel)
Input Level: TTL: 0 OFF 1 ON or 1 OFF 0 ON

General

Interfaces: optional IEEE-488 (HO88-2) or RS-232 (HO89-2)
IEEE-488 functions: (T6),(L4) SH1, AH1, RL1, DC1, DT0 and R (HO80-3)
Set-up memory locations: 10
Dimensions / Weight: 285 x 75 x 365 (W x H x D) / approx. 10kg
Power Consumption: approx. 70VA
Operating Conditions: +0°C to +40°C
Humidity: 10% - 90% no condensation
Warm up time: typ. 60min. for specifications
Supply Voltages: 115/230V ±10%, 50-60Hz
Safety: class I (IEC 1010-1/VDE 0411)

Accessories supplied: Line cord, Operating Manual
Optional Accessories: HZ33, HZ34: 50Ω Coaxial cable BNC-BNC; HZ24: BNC 50Ω attenuators (3 / 6 / 10 / 20 dB); **HZ42:** 19" rack mount kit;
HZ72-S/L: Double shielded IEEE-488-Bus cable, 1m/1.5m. **HO88-2:** IEEE-488 Interface; **HO89-2:** RS-232 Interface.

230403