

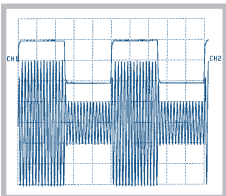
## 1.2 GHz RF-Synthesizer HM8134-3



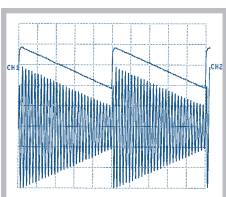
HZ42 19" Rackmount kit 2RU



Internal modulation source



Internal modulation source



Frequency range from 1 Hz to 1.2 GHz

Output power from -127 dBm to +13 dBm

Frequency resolution 1 Hz (accuracy 0.5 ppm)

Input for external time base (10 MHz)

Modulation modes: AM, FM, Puls,  $\Phi$ , FSK, PSK

Rapid pulse modulation: typ. 200 ns

Internal modulator 10 Hz to 150 kHz

High spectral purity

OXC0 optional

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



## 1.2 GHz HF Synthesizer HM8134-3

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

### Frequency

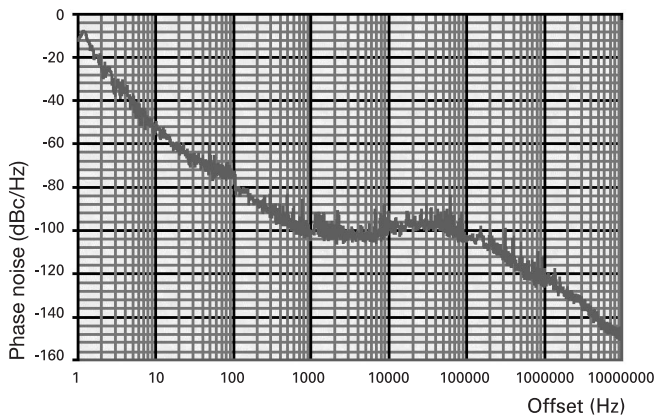
|                |                  |
|----------------|------------------|
| Range:         | 1 Hz to 1200 MHz |
| Resolution:    | 1 Hz             |
| Settling time: | < 10 ms          |

### Frequency Reference 10 MHz

|                            |                            |
|----------------------------|----------------------------|
| Standard:                  | TCXO                       |
| Stability (0 to 50 °C):    | ≤ ±0.5 ppm                 |
| Aging:                     | ≤ ±1 ppm/year              |
| Option: OCXO (H085)        |                            |
| Stability:                 | ≤ ±1.10 <sup>-8</sup>      |
| Aging:                     | ≤ ±5.10 <sup>-9</sup> /day |
| Internal reference output: | (rear panel)               |
| Level:                     | TTL                        |
| External reference input:  | (rear panel)               |
| Level:                     | > 0 dBm                    |

### Spectral purity (without modulation)

|                   |                                   |
|-------------------|-----------------------------------|
| Harmonic:         | ≤ -35 dBc                         |
| Non-harmonic:     | ≤ -55 dBc (> 15 kHz from carrier) |
| 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                     |
| 1000 to 1200 MHz: | ≤ -95 dBc/Hz                      |



[Typical phase noise at 1 GHz]

### Output level

|             |                                 |
|-------------|---------------------------------|
| Range:      | -127 to +13 dBm                 |
| Resolution: | 0.1 dB                          |
| Precision:  | ≤ ±0.5 dB (for level > -57 dBm) |
| Impedance:  | 50 Ω                            |
| V.S.W.R.:   | ≤ 1 : 1.5                       |

### Modulation sources

|                          |  |
|--------------------------|--|
| Internal:                | 10 Hz - 150 kHz sine wave,<br>10 Hz - 20 kHz square wave, triangle,<br>saw tooth |
| Resolution:              | 10 Hz  |
| External:                | (input on front panel)   |
| Impedance:               | 10 kΩ    50 pF   |
| Input level:             | 2V <sub>rms</sub> for full scale   |
| Coupling:                | AC or DC   |
| Output (on front panel): | Impedance: 1 kΩ<br>Level: 2V <sub>rms</sub>                                      |

### Amplitude modulation (Level ≤ +7 dBm)

|                                  |  |
|----------------------------------|--|
| Source:                          | internal or external   |
| Modulation depth:                | 0 to 100 %   |
| Resolution:                      | 0.1 %  |
| Accuracy:                        | ± 4 % of reading ± 0.5 %<br>[AM-depth ≤ 80 % and f <sub>mod</sub> ≤ 1 kHz]                                       |
| Ext. frequency resp. (to -1 dB): | 10 Hz to 50 kHz for AC   |
| Distortion:                      | < 2 % [AM-depth ≤ 60 %, f <sub>mod</sub> ≤ 1 kHz]<br>< 6 % [AM-depth ≤ 80 %, f <sub>mod</sub> : 10 Hz to 50 kHz] |

### Frequency modulation

|                                     |  |
|-------------------------------------|--|
| Source:                             | internal or external   |
| Deviation:                          | ± 200 Hz to 400 kHz<br>(depending on frequency band)                                   |
| Resolution:                         | 100 Hz   |
| Accuracy:                           | f <sub>mod</sub> < 5 kHz: ±(3% + res. FM)<br>f <sub>mod</sub> > 5 kHz: ±(7% + res. FM) |
| Ext. frequency response: (to -1 dB) |  |
| DC coupling:                        | 0 to 150 kHz   |
| AC coupling:                        | 10 Hz to 150 kHz   |
| Distortion:                         | < 3 % for deviation ≥ 10 kHz at 1 kHz  |

### Phase modulation

|                                      |   |
|--------------------------------------|---|
| Source:                              | internal or external                                      |
| Deviation:                           | < 16 MHz: 0 to 3.14 rad<br>> 16 MHz: 0 to 10 rad          |
| Resolution:                          | 0.01 rad  |
| Accuracy:                            | ± 5 % to 1 kHz + residual PM                              |
| Ext. frequency response : (to -1 dB) |   |
| DC coupling:                         | 0 to 150 kHz  |
| AC coupling:                         | 10 Hz to 150 kHz  |
| Distortion:                          | < 3 % for f <sub>mod</sub> = 1 kHz and deviation = 10 rad |

### FSK modulation

|                  |                |
|------------------|----------------|
| Range (F0 - F1): | 16 to 1200 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): | < 16 MHz: 0 to ± 3.14 rad<br>> 16 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 1200 MHz  |
| Depth:      | 500 Hz to 1199 MHz |
| Sweep time: | 10 ms to 5 s       |
| Trigger:    | internal           |

### Protective functions

The synthesiser is protected against reverse power applied on RF output up to 1W for a 50 Ω source and against any DC source up to ± 7V. The protection disconnects the output until manually rearmed by operator.

### Miscellaneous

|                         |                                   |
|-------------------------|-----------------------------------|
| Interface:              | 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  
H0870 USB Interface  
H0880 IEEE-488 interface,  
H0890 RS-232 Interface