Модулирующий генератор сигналов HM8150

R&S®HM8150 Function Generator

Key features

- ► Waveforms: sine wave, square wave, triangle, pulse, sawtooth, arbitrary
- ► Rise and fall time: < 10 ns
- ► Pulse width adjustment: 100 ns to 80 s
- ► Arbitrary waveform generator: 40 MSa/s
- ► Burst, gating, external triggering, sweep
- ► Free of charge software for creation of arbitrary waveforms
- ► External amplitude modulation (bandwidth 20 kHz)
- ► Intuitive operation with one touch of a button – quick change of signals

Key specifications	
Frequency range	10 mHz to 12.5 MHz
Output voltage	10 mV_{pp} to 10 V_{pp} (into 50 Ω) 20 mV_{pp} to 20 V_{pp} (open circuit)
Total harmonic distortion	0.05% typ. (f < 100 kHz)
DC offset	±75 mV to 7.5 V
Arbitrary waveform resolution	12 bit

Your benefit	Features
Easy to use	► With the touch of one button, the R&S®HM8150 offers six different waveforms ► Frequency and amplitude can be varied for sawtooth (ramp), triangle, sine and square wave signals ► The pulse function permits the pulse width to be modified
Versatile functionality	► In addition to the "continuous" operating mode, signals can be generated in response to a trigger and a gating signal ► Frequency sweep is available for sine wave, square wave, sawtooth, pulse and arbitrary waveforms ► Arbitrary signals can be defined by the user via the RS-232, GPIB or USB interface

Technical Data

12.5 MHz Arbitrary Function Generator R&S®HM8150

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

Frequency	
Range	10 mHz to 12.5 MHz
Resolution	5 digit, max. 10 mHz
Accuracy	± (1 digit + 5 mHz)
Temperature coefficient	0.5 ppm/°C
Aging	2 ppm/year
Waveforms **Sine wave**	
Frequency range	10 mHz to 12.5 MHz
Amplitude	20 mV (V_{pp}) to 20 V (V_{pp}) (open circuit)
Harmonic distortion at 1 V (V_{pp})	
f < 500 kHz	–65 dBc
500 kHz ≤ f < 5 MHz	–50 dBc
5 MHz ≤ f ≤ 12.5 MHz	–40 dBc
Total harmonic distortion at 1 V (V_{pp})	
f < 100 kHz	typ. 0.05 %
Spurious (non-harmonic) at 1 V (V_{pp})	
f < 500 kHz	–65 dBc
500 kHz ≤ f ≤ 12.5MHz	–65 dBc + 6 dBc/octave
Square wave	
Frequency range	10 mHz to 12.5 MHz
Amplitude	20 mV (V_{pp}) to 20 V (V_{pp}) (open circuit)
Rise/fall time	< 10 ns
Overshoot	< 5 % (U_{out} ≤ 200 mV)
Symmetry	50 % ± (5 % +10 ns)
Pulse	
Frequency range	10 mHz to 5 MHz
Amplitude	10 mV (V_{pp}) to +10 V (V_{pp}) or –10 mV (V_{pp}) to –10 V (V_{pp})
Rise/fall time	< 10 ns
Pulse width	100 ns to 80 s
Duty cycle	max. 90 %
Sawtooth	
Frequency range	10 mHz to 25 kHz
Amplitude	20 mV (V_{pp}) to 20 V (V_{pp}) (open circuit)
Linearity	better than 1 %
Triangle	
Frequency range	10 mHz to 250 kHz
Amplitude	20 mV (V_{pp}) to 20 V (V_{pp}) (open circuit)
Linearity	better than 1 %
Arbitrary generator	
Frequency range	10 mHz to 250 kHz
Amplitude	20 mV (V_{pp}) to 20 V (V_{pp}) (open circuit)
Output rate	40 MSa/s
Resolution	X 1.024 (10 Bit), Y 1.024 (10 Bit) or X 4.096 (12 Bit), Y 4.096 (12 Bit)
Inputs	
Gate/Trigger	BNC connector
Impedance	5 kΩ II 100 pF
Max. input voltage	±30 V
Modulation input	BNC connector
Impedance	10 kΩ
Max. input voltage	±30 V
Outputs	
Signal output	BNC connector, short circuit proof, ext. voltage up to ±15 V
Impedance	50 Ω
Output voltage	
Range 1	2.1 V (V_{pp}) to 20 V (V_{pp}) (open circuit)
Range 2	0.21 V (V_{pp}) to 2,0 V (V_{pp}) (open circuit)
Range 3	20 mV (V_{pp}) to 200 mV (V_{pp}) (open circuit)
Resolution	
Range 1	100 mV
Range 2	10 mV
Range 3	1 mV
Setting accuracy (1 kHz)	
Range 1	±2 %
Range 2	±3 %
Range 3	±4 %
3 % additional for pulse and square wave	
Frequency response	
< 100 kHz	±0.2 dB
0.1 to 12.5 MHz	±0.5 dB
Offset error	
Range 3	±50 mV
Display	2½ digits (LCD)
Trigger output	BNC connector
Level	5 V/TTL
Impedance	50 Ω
Sawtooth output	BNC connector
Output voltage	0 to 5 V, synchronous to sweep
Impedance	1 kΩ
DC-Offset	
Output voltage	
Range 1	–7.5 V to +7.5 V (open circuit)
Range 2	–0.75 V to +0.75 V (open circuit)
Range 3	–75 mV to +75 mV (open circuit)
$V_{ac\ range} + 2 \times V_{offset\ range} \leq V_{range\ max}$	
Sweep (internal)	
Setting of start and stop frequencies	
Internal sweep	all waveforms
Sweep time	linear, 20 ms to 100 s continuous or triggered (ext. signal, interface)
Amplitude modulation	
Modulation via external signal	
Modulations depth	0 to 100 %
Bandwidth	DC to 20 kHz (–3 dB)
Gate (asynchronuous)	
Modulation on/off via external TTL signal	
Delay time	< 150 ns
Input singal	TTL
Trigger function (synchronuous)	
Burst mode via ext. trigger input or interface	
Frequency range	< 500 kHz
Miscellaneous	
Interface	dual-interface USB/RS-232 (HO820), optional HO880 IEEE-488 (GPIB)
Display	16 characters, LCD with backlight
Memory	for the last device settings and for 1 arbitrary signal
Safety class	Safety Class I (EN61010-1)
Power supply	115 V to 230 V ± 10 %; 50 Hz to 60 Hz, CAT II
Power consumption	ca. 20 W
Operating temperature	+5 °C to +40 °C
Storage temperature	–20 °C to +70 °C
Rel. humidity	5 % to 80 % (noncondensing)
Dimensions (B × H × T)	285 mm × 75 mm × 365 mm (11.2 in × 3 in × 14.4 in)
Weight	approx. 5 kg (11 lb)

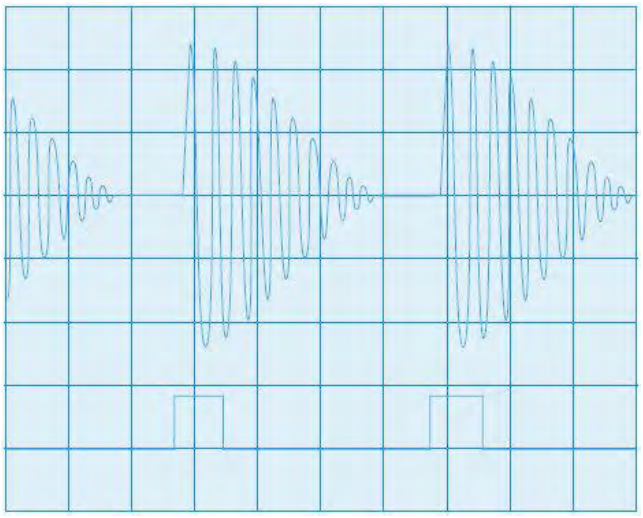
Accessories supplied:

Line cord, Operating manual

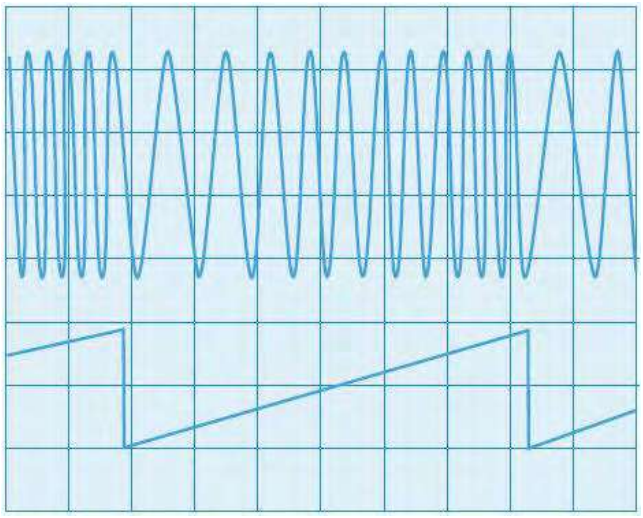
Recommended accessories:

R&S®HO880	Interface IEEE-488 (GPIB), galvanically isolated
R&S®HZ20	Adapter, BNC to 4 mm banana
R&S®HZ24	Attenuators 50 Ω (3/6/10/20 dB)
R&S®HZ42	19" Rackmount kit 2RU
R&S®HZ72	GPIB-Cable 2 m

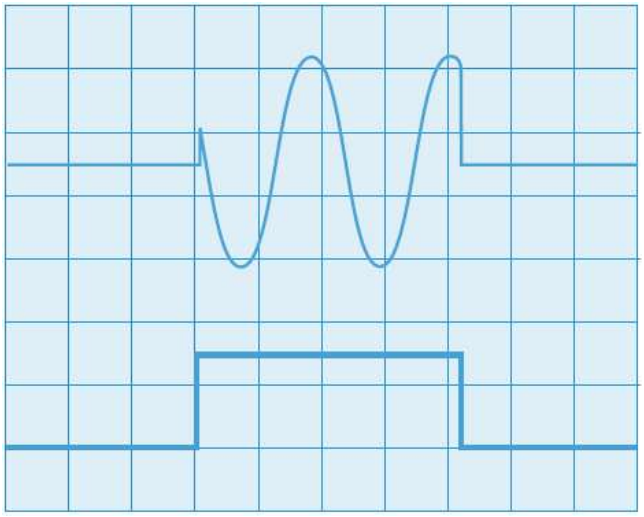
Signal examples



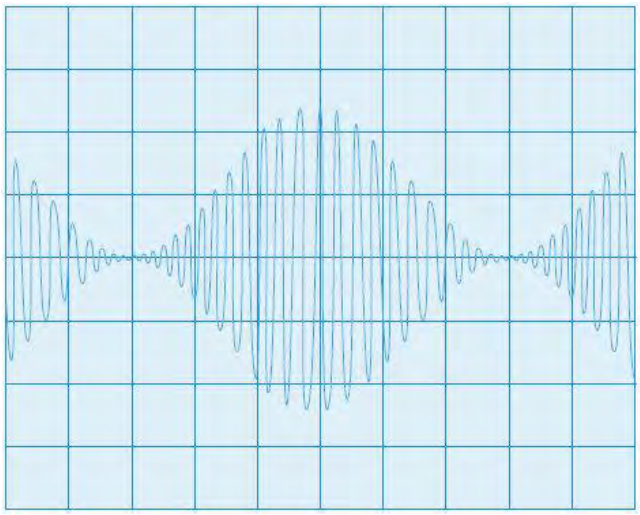
Triggered arbitrary signal.



Swept sine wave and sawtooth signal.



Output signal controlled by a gate signal).



Sine wave with amplitude modulation (using the external modulation input).

Ordering information	
Base unit	**Item**
Function generator	R&S®HM8150
Options/system components	**Item**
IEEE-488 (GBIP) interface	R&S®HO880
19" rackmount kit, 2 HU	R&S®HZ42

Included accessories:
The R&S®HM8150 includes power cable, operating manual and three-year warranty.