

# Test Equipment Solutions Datasheet

Test Equipment Solutions Ltd specialise in the second user sale, rental and distribution of quality test & measurement (T&M) equipment. We stock all major equipment types such as Spectrum Analyzers, Signal Generators, Oscilloscopes, Power Meters, Network Analyzers etc from all the major suppliers such as Keysight, Tektronix, Anritsu and Rohde & Schwarz.

We are focused at the professional end of the marketplace, primarily working with customers for whom high performance, quality and service are key, whilst realising the cost savings that second user equipment offers. We fully test & refurbish equipment in our in-house, traceable Lab. Items are supplied with manuals, accessories and typically a full no-quibble 1 year warranty. Our staff have extensive backgrounds in T&M which enables us to deliver industry-leading service and support. We endeavour to be customer focused in every way right down to the detail, such as offering free delivery on sales, presenting flexible technical + commercial solutions and supplying a loan unit during warranty repair, if available.

As well as the headline benefit of cost saving, second user offers shorter lead times, higher reliability and multivendor solutions. Rental, of course, is ideal for shorter term needs and offers fast delivery, flexibility, try-before-you-buy, zero capital expenditure, lower risk and off balance sheet accounting. Both second user and rental improve the key business measure of Return On Capital Employed.

We are based in at Oakley, Bedfordshire in the UK from where we supply test equipment worldwide. Our facility incorporates Sales, Support, Admin, Logistics and our own in-house Lab.

All products supplied by Test Equipment Solutions include:

- No-quibble parts & labour warranty (we provide transport for UK mainland addresses).
- Free loan equipment during warranty repair, if available.
- Full electrical, mechanical and safety refurbishment in our 40GHz in-house Lab.
- Certificate of Conformance (calibration available on request).
- Manuals and accessories required for normal operation.
- Free insured delivery to your UK mainland address (sales).
- Support from our team of seasoned Test & Measurement engineers.
- ISO9001 quality assurance.

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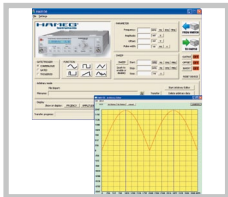
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Web: [www.TestEquipmentHQ.com](http://www.TestEquipmentHQ.com)



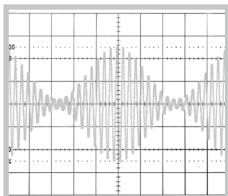
## 12.5MHz Arbitrary Function Generator HM8150



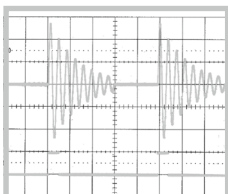
Gated Sine Wave,  
PC-Software included



Amplitude-modulated  
Sine Wave



Triggered Arbitrary Signal



- ✓ Frequency Range 10mHz...12.5MHz
- ✓ Output Voltage 10mV<sub>pp</sub>...10V<sub>pp</sub> (into 50Ω)
- ✓ Waveforms: Sine Wave, Square Wave, Triangle, Pulse, Sawtooth, Arbitrary
- ✓ Rise and Fall Time <10ns
- ✓ Pulse width Adjustment: 100ns...80s
- ✓ Arbitrary Waveform Generator 40MSa/s
- ✓ Burst, Gating, External Triggering, Sweep
- ✓ Free of charge Software for Remote Control and for Creation of Arbitrary Waveforms
- ✓ External Amplitude Modulation (Bandwidth 20kHz)
- ✓ Intuitive Operation with one touch of a Button – quick Change of Signals
- ✓ Galvanically isolated USB/RS-232 Dual-Interface, optional IEEE-488 (GPIB)

## 12.5 MHz Arbitrary Function Generator HM8150

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

### Frequency

|                          |                      |
|--------------------------|----------------------|
| Range:                   | 10 mHz...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...12.5 MHz                                        |
| Amplitude:                                      | 20 mV <sub>pp</sub> ...20 V <sub>pp</sub> (open circuit) |
| Harmonic Distortion @ 1 V <sub>pp</sub> :       |                                                          |
| f < 500 kHz                                     | -65 dBc                                                  |
| 500 kHz ≤ f < 5 MHz                             | -50 dBc                                                  |
| 5 MHz ≤ f ≤ 12.5 MHz                            | -40 dBc                                                  |
| Total Harmonic Distortion @ 1 V <sub>pp</sub> : |                                                          |
| f < 100 kHz                                     | typ. 0.05%                                               |
| Spurious (Non-Harmonic) @ 1 V <sub>pp</sub> :   |                                                          |
| f < 500 kHz                                     | -65 dBc                                                  |
| 500 kHz ≤ f ≤ 12.5 MHz                          | -65 dBc + 6 dBc/octave                                   |

### Square wave

|                  |                                                          |
|------------------|----------------------------------------------------------|
| Frequency range: | 10 mHz...12.5 MHz                                        |
| Amplitude:       | 20 mV <sub>pp</sub> ...20 V <sub>pp</sub> (open circuit) |
| Rise/fall time:  | < 10 ns                                                  |
| Overshoot:       | < 5 % (V <sub>out</sub> ≤ 200 mV)                        |
| Symmetry:        | 50 % ±(5 % + 10 ns)                                      |

### Pulse

|                  |                                                                                           |
|------------------|-------------------------------------------------------------------------------------------|
| Frequency range: | 10 mHz...5 MHz                                                                            |
| Amplitude:       | 10 mV <sub>pp</sub> ...+10 V <sub>pp</sub> or -10 mV <sub>pp</sub> ...-10 V <sub>pp</sub> |
| Rise/fall time:  | < 10 ns                                                                                   |
| Pulse width:     | 100 ns...80 s                                                                             |
| Duty cycle:      | max. 90 %                                                                                 |

### Sawtooth

|                  |                                                          |
|------------------|----------------------------------------------------------|
| Frequency range: | 10 mHz...25 kHz                                          |
| Amplitude:       | 20 mV <sub>pp</sub> ...20 V <sub>pp</sub> (open circuit) |
| Linearity:       | better than 1 %                                          |

### Triangle

|                  |                                                          |
|------------------|----------------------------------------------------------|
| Frequency range: | 10 mHz...250 kHz                                         |
| Amplitude:       | 20 mV <sub>pp</sub> ...20 V <sub>pp</sub> (open circuit) |
| Linearity:       | better than 1 %                                          |

### Arbitrary generator

|                  |                                                                                 |
|------------------|---------------------------------------------------------------------------------|
| Frequency range: | 10 mHz...250 kHz                                                                |
| Amplitude:       | 20 mV <sub>pp</sub> ...20 V <sub>pp</sub> (open circuit)                        |
| Output rate:     | 40 MSa/s                                                                        |
| Resolution:      | X: 1,024 (10 bit), Y: 1,024 (10 bit) or<br>X: 4,096 (12 bit), Y: 4,096 (12 bit) |

### Inputs

|                    |                |
|--------------------|----------------|
| Gate/Trigger:      | BNC connector  |
| Impedance          | 5 kΩ    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,<br>ext. voltage up to ±15 V                                                                                             |
| Impedance                | 50 Ω                                                                                                                                                        |
| Output voltage           | Range 1: 2.1...20 V <sub>pp</sub> (open circuit)<br>Range 2: 0.21...2.0 V <sub>pp</sub> (open circuit)<br>Range 3: 20...200 mV <sub>pp</sub> (open circuit) |
| Resolution               | Range 1: 100 mV<br>Range 2: 10 mV<br>Range 3: 1 mV                                                                                                          |
| Setting accuracy (1 kHz) | Range 1: ±2 %<br>Range 2: ±3 %<br>Range 3: ±4 %<br>3 % additional for pulse and square wave                                                                 |
| Frequency response       | < 100 kHz ±0.2 dB<br>0.1...12.5 MHz: ±0.5 dB                                                                                                                |
| Offset error             | Range 3: ±50 mV                                                                                                                                             |
| Display                  | 2½ digits (LCD)                                                                                                                                             |

Trigger output: BNC connector

|           |        |
|-----------|--------|
| Level     | 5V/TTL |
| Impedance | 50 Ω   |

Sawtooth output: BNC connector

|                |                               |
|----------------|-------------------------------|
| Output voltage | 0...5 V, synchronous to sweep |
| Impedance      | 1 kΩ                          |

### DC offset

|                 |                                                                                                                                                                                                           |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Output voltage: | Range 1: -7.5...+7.5 V (open circuit)<br>Range 2: -0.75...+0.75 V (open circuit)<br>Range 3: -75...+75 mV (open circuit)<br>V <sub>acrange</sub> + 2 x V <sub>offsetrange</sub> ≤ V <sub>range max.</sub> |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Sweep (internal)

Setting of start and stop frequencies:

|                 |                                                                           |
|-----------------|---------------------------------------------------------------------------|
| Internal sweep: | all waveforms                                                             |
| Sweep time:     | linear, 20 ms...100 s continuous or triggered<br>(ext. signal, interface) |

### Amplitude Modulation

Modulation via external signal:

|                    |                     |
|--------------------|---------------------|
| Modulations depth: | 0...100 %           |
| Bandwidth:         | DC...20 kHz (-3 dB) |

### Gate (asynchronous)

Modulation on/off via external TTL signal:

|               |          |
|---------------|----------|
| Delay time:   | < 150 ns |
| Input signal: | TTL      |

### Trigger Function (synchronous)

Burst mode via ext. trigger input or interface:

|                  |           |
|------------------|-----------|
| Frequency range: | < 500 kHz |
|------------------|-----------|

### Miscellaneous

|                         |                                                                  |
|-------------------------|------------------------------------------------------------------|
| Interface:              | Dual-Interface USB/RS-232 (H0820),<br>IEEE-488 (GPIB) (optional) |
| Display:                | 16 characters, LCD with backlight                                |
| Memory:                 | for the last device settings and for<br>1 arbitrary signal       |
| Safety Class:           | Safety Class I (EN61010-1)                                       |
| Power supply:           | 115...230 V ± 10 %, 50...60 Hz, CAT II                           |
| Power consumption:      | approx. 20 W                                                     |
| Operating temperature:  | +5...+40 °C                                                      |
| Storage temperature:    | -20...+70 °C                                                     |
| Rel. humidity:          | 5...80 % (non condensing)                                        |
| Dimensions (W x H x D): | 285 x 75 x 365 mm                                                |
| Weight:                 | approx. 5 kg                                                     |

Accessories supplied: Line cord, Operating manual, CD, Software

Recommended accessories:

|       |                                                  |
|-------|--------------------------------------------------|
| H0880 | Interface IEEE-488 (GPIB), galvanically isolated |
| HZ13  | Interface cable (USB) 1.8 m                      |
| HZ14  | Interface cable (serial) 1:1                     |
| HZ20  | Adapter, BNC to 4 mm banana                      |
| HZ24  | Attenuators 50 Ω (3/6/10/20 dB)                  |
| HZ33  | Test cable 50 Ω, BNC/BNC, 0.5 m                  |
| HZ34  | Test cable 50 Ω, BNC/BNC, 1.0 m                  |
| HZ42  | 19" Rackmount kit 2RU                            |
| HZ72  | GPIB-Cable 2 m                                   |