

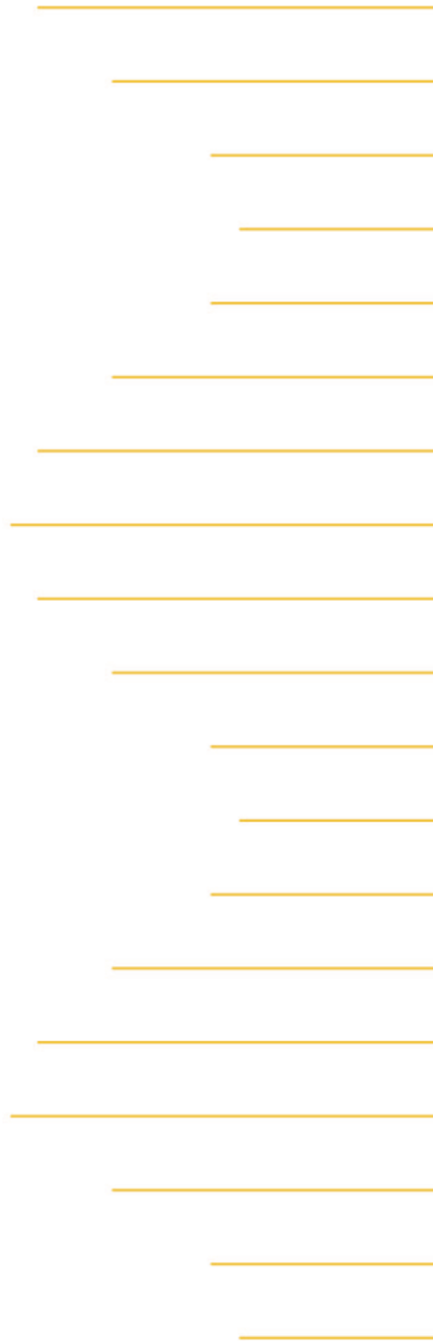


RIGOL

# DHO800 Series

## Digital Oscilloscope

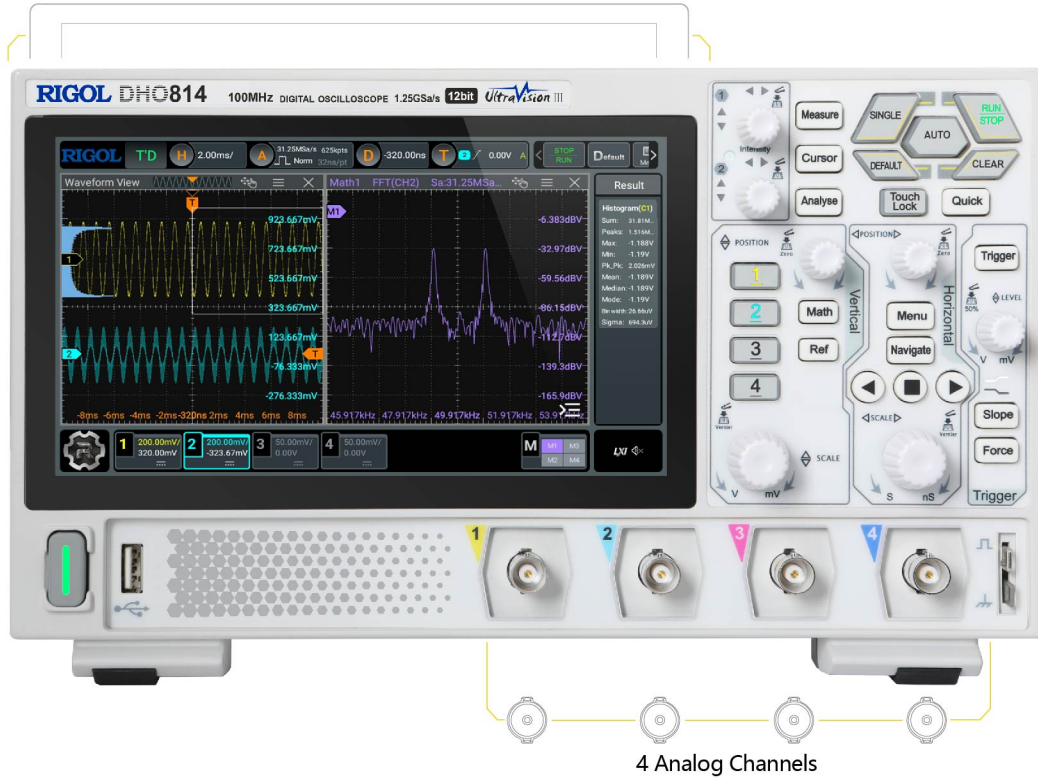
Data Sheet  
DSA36101-1110  
Jul. 2023



# DHO800 Series Digital Oscilloscope

Compact Size, Various Interfaces

7" Capacitive Multi-touch Screen



4 Analog Channels



265.35 mm (W) × 161.75 mm (H) × 77.38 mm (D)



## Application Scenarios

It is compact and portable, easy to be used on the workbench, in the classroom, on the test site, and in other application scenarios.

Its compact and delicate design makes it easy to carry and operate. You can put it on the workbench, with supporting legs folded or unfolded; put it flat on the workbench; or fix its rear panel to the desktop clamp-on stand to save room.

## Technical Advantage

### ● 12-bit High Resolution



**12-bit** vertical resolution provides 4096 vertical digitizing levels

16 times the vertical digitizing level of the 8-bit resolution

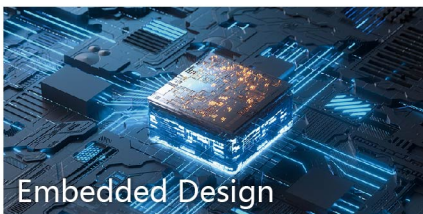
Easy for users to test and see the small signals

### ● Type-C Interface



Provides power with the mobile power supply via this interface, making the on-site test more flexible.

## Application



Embedded Design

The bus error and too much locking may lead to problems in the embedded design. The DHO800 series is equipped with a standard configuration of protocol triggers and decodes, capable of capturing the bus event accurately to check whether the serial communication link between devices runs properly.



Electronics Maintenance

When troubleshooting a failed component, we need to quickly locate the problem and make some modifications. With the auto measurement, math operation, protocol trigger and decode, the DHO800 series enables you to debug the problems with a high speed and locate the problem accurately.



Basics R&D

The DHO800 series offers professional user experience at an affordable entry-level price. The brand new DHO800 series supports touch screen operation and the traditional convenient panel operation. It is an ideal high-precision oscilloscope with 12-bit measurement accuracy at an affordable price for your lab.

# Product Features

## Product Features

- Ultra-low noise floor, purer signal, never miss the small signals
- Up to 12 bits resolution for all the models of this series
- Max. analog bandwidth of 100 MHz, 4 analog channels, external trigger output (std.) available for the dual-channel model
- Max. real-time sample rate of 1.25 GSa/s
- Max. memory depth of 25 Mpts
- Vertical sensitivity range: 500  $\mu$ V/div to 10 V/div
- Max. capture rate of 1,000,000 wfms/s (in UltraAcquire mode)
- Digital phosphor display with real-time 256-level intensity grading
- Waveform search and navigation function allows you to debug the signal anomalies faster
- 7" (1024x600) capacitive multi-touch screen
- Brand new Flex Knob brings user-friendly experience
- USB Device & Host, LAN, and HDMI interfaces (std.) for all the models of this series
- Novel and delicate industrial design, easy to operate
- Unique online upgrade






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The DHO800 series is RIGOL's new launched high-performance economical digital oscilloscope. Though compact in design, it has superior performance. It features a capture rate up to 1,000,000 wfms/s (in UltraAcquire Mode), 25 Mpts memory depth, 12 bits resolution, and low noise.








The DHO800 series is a brand new economical digital oscilloscope designed for the vast mainstream digital oscilloscope market to meet their design, debugging, and test demands.






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# RIGOL Probes and Accessories Supported

| Model  | Type                         | Description   |
|--|------------------------------|---|
| <b>Passive High-impedance Probe</b>  |                              |   |
|  <p>PVP2150</p>   | Passive High-impedance Probe | <ul style="list-style-type: none"> <li>• Attenuation: 10:1/1:1</li> <li>• 1X BW: DC to 35 MHz</li> <li>• 10X BW: DC to 150 MHz</li> <li>• Compatibility: All models of RIGOL's digital oscilloscopes</li> </ul>   |
|  <p>PVP2350</p>   | Passive High-impedance Probe | <ul style="list-style-type: none"> <li>• Attenuation: 10:1/1:1</li> <li>• 1X BW: DC to 35 MHz</li> <li>• 10X BW: DC to 350 MHz</li> <li>• Compatibility: All models of RIGOL's digital oscilloscopes</li> </ul>   |
|  <p>PVP3150</p> | Passive High-impedance Probe | <ul style="list-style-type: none"> <li>• Attenuation: 10:1/1:1</li> <li>• 1X BW: DC to 20 MHz</li> <li>• 10X BW: DC to 150 MHz</li> <li>• Compatibility: All models of RIGOL's digital oscilloscopes</li> </ul>   |
| <b>High-voltage Single-ended Probe</b>   |                              |   |
|  <p>RP1010H</p> | High-voltage Probe           | <ul style="list-style-type: none"> <li>• Attenuation: 1000:1</li> <li>• BW: DC to 40 MHz</li> <li>• DC: 0 to 10 kV DC</li> <li>• AC: pulse <math>\leq 20</math> kVp-p</li> <li>• AC: sine <math>\leq 7</math> kV<sub>rms</sub></li> <li>• Compatibility: All models of RIGOL's digital oscilloscopes</li> </ul> |
|  <p>RP1018H</p> | High-voltage Probe           | <ul style="list-style-type: none"> <li>• Attenuation: 1000:1</li> <li>• BW: DC to 150 MHz</li> <li>• DC+AC<sub>peak</sub>: 18 kV CAT II</li> <li>• AC<sub>rms</sub>: 12 kV CAT II</li> <li>• Compatibility: All models of RIGOL's digital oscilloscopes</li> </ul>  |



| Model  | Type                            | Description  |
|--|---------------------------------|--|
|  <p>RP1300H</p>   | High-voltage Probe              | <ul style="list-style-type: none"> <li>• Attenuation: 100:1</li> <li>• BW: DC to 300 MHz</li> <li>• CAT I 2000 V (DC+AC)</li> <li>• CAT II 1500 V (DC+AC)</li> <li>• Compatibility: All models of RIGOL's digital oscilloscopes</li> </ul> |
| <b>High-voltage Differential Probe</b>   |                                 |  |
|  <p>PHA0150</p>   | High-voltage Differential Probe | <ul style="list-style-type: none"> <li>• BW: DC to 70 MHz</li> <li>• Max. voltage <math>\leq 1500</math> Vpp</li> <li>• Compatibility: All models of RIGOL's digital oscilloscopes</li> </ul>  |
|  <p>PHA1150</p>   | High-voltage Differential Probe | <ul style="list-style-type: none"> <li>• BW: DC to 100 MHz</li> <li>• Max. voltage <math>\leq 1500</math> Vpp</li> <li>• Compatibility: All models of RIGOL's digital oscilloscopes</li> </ul>   |
|  <p>PHA2150</p> | High-voltage Differential Probe | <ul style="list-style-type: none"> <li>• 50X BW: DC to 160 MHz</li> <li>• 500X BW: DC to 200 MHz</li> <li>• Max. voltage <math>\leq 1500</math> Vpp</li> <li>• Compatibility: All models of RIGOL's digital oscilloscopes</li> </ul>       |
|  <p>RP1025D</p> | High-voltage Differential Probe | <ul style="list-style-type: none"> <li>• BW: DC to 25 MHz</li> <li>• Max. voltage <math>\leq 1400</math> Vpp (DC + AC P-P)</li> <li>• Compatibility: All models of RIGOL's digital oscilloscopes</li> </ul>                                |
|  <p>RP1050D</p> | High-voltage Differential Probe | <ul style="list-style-type: none"> <li>• BW: DC to 50 MHz</li> <li>• Max. voltage <math>\leq 7000</math> Vpp (DC + AC P-P)</li> <li>• Compatibility: All models of RIGOL's digital oscilloscopes</li> </ul>                                |
|  <p>RP1100D</p> | High-voltage Differential Probe | <ul style="list-style-type: none"> <li>• BW: DC to 100 MHz</li> <li>• Max. voltage <math>\leq 7000</math> Vpp (DC + AC P-P)</li> <li>• Compatibility: All models of RIGOL's digital oscilloscopes</li> </ul>                               |

| Model  | Type          | Description   |
|--|---------------|---|
| <b>Current Probe</b>   |               |   |
|  <p>RP1001C</p>   | Current Probe | <ul style="list-style-type: none"> <li>BW: DC to 300 kHz</li> <li>Maximum Input <ul style="list-style-type: none"> <li>AC: <math>\pm 100</math> A</li> <li>AC P-P: 200 A</li> <li>AC RMS: 70 A</li> </ul> </li> <li>Compatibility: All models of RIGOL's digital oscilloscopes</li> </ul>   |
|  <p>RP1002C</p>   | Current Probe | <ul style="list-style-type: none"> <li>BW: DC to 1 MHz</li> <li>Maximum Input <ul style="list-style-type: none"> <li>AC: <math>\pm 70</math> A</li> <li>AC P-P: 140 A</li> <li>AC RMS: 50 A</li> </ul> </li> <li>Compatibility: All models of RIGOL's digital oscilloscopes</li> </ul>  |
|  <p>RP1003C</p> | Current Probe | <ul style="list-style-type: none"> <li>BW: DC to 50 MHz</li> <li>Maximum Input <ul style="list-style-type: none"> <li>AC P-P: 50 A (non-continuous)</li> <li>AC RMS: 30 A</li> </ul> </li> <li>Compatibility: All models of RIGOL's digital oscilloscopes</li> <li>Required to order RP1000P power supply.</li> </ul>   |
|  <p>RP1004C</p> | Current Probe | <ul style="list-style-type: none"> <li>BW: DC to 100 MHz</li> <li>Maximum Input <ul style="list-style-type: none"> <li>AC P-P: 50 A (non-continuous)</li> <li>AC RMS: 30 A</li> </ul> </li> <li>Compatibility: All models of RIGOL's digital oscilloscopes</li> <li>Required to order RP1000P power supply.</li> </ul>  |
|  <p>RP1005C</p> | Current Probe | <ul style="list-style-type: none"> <li>BW: DC to 10 MHz</li> <li>Maximum Input <ul style="list-style-type: none"> <li>AC P-P: 300 A (non-continuous), 500 A (@pulse width <math>\leq 30</math> us)</li> <li>AC RMS: 150 A</li> </ul> </li> <li>Compatibility: All models of RIGOL's digital oscilloscopes</li> <li>Required to order RP1000P power supply.</li> </ul> |

| Model  | Type             | Description  |
|--|------------------|--|
|  <p>RP1006C</p> | Current Probe    | <ul style="list-style-type: none"> <li>• BW: DC to 2 MHz</li> <li>• Maximum Input</li> </ul> <p>AC P-P: 700 A peaks, non-continuous</p> <p>AC RMS: 500 A</p> <ul style="list-style-type: none"> <li>• Compatibility: All models of RIGOL's digital oscilloscopes</li> <li>• Required to order RP1000P power supply.</li> </ul> |
|  <p>RP1000P</p> | 4CH Power Supply | Power supply for RP1003C, RP1004C, RP1005C, and RP1006C; supporting 4 channels.  |



# Specifications

All the specifications are guaranteed except the parameters marked with "Typical" and the oscilloscope needs to operate for more than 30 minutes under the specified operation temperature.

## Overview of the DHO800 Series Technical Specifications

| Overview of the DHO800 Series Technical Specifications |   |        |         |        |
|--|---|--------|---------|--------|
| Model  | DHO802  | DHO804 | DHO812  | DHO814 |
| Analog Bandwidth (-3 dB)                               | 70 MHz  |        | 100 MHz |        |
| Rise Time (10% to 90%, typical)                        | ≤5 ns   |        | ≤3.5 ns |        |
| No. of Analog Channels                                 | 2 + EXT   | 4      | 2 + EXT | 4      |
| Sampling Mode  | Real-time Sampling  |        |         |        |
| Max. Sample Rate of Analog Channel                     | Two-channel model:<br>1.25 GSa/s (single-channel <sup>[1]</sup> ), 625 MSa/s (full-channel <sup>[3]</sup> )<br>four-channel model:<br>1.25 GSa/s (single-channel <sup>[1]</sup> ), 625 MSa/s (dual-channel <sup>[2]</sup> ), 312.5 MSa/s (full-channel <sup>[3]</sup> ) |        |         |        |
| Max. Memory Depth                                      | Two-channel model:<br>25 Mpts (single-channel <sup>[1]</sup> ), 10 Mpts (full-channel <sup>[3]</sup> )<br>four-channel model:<br>25 Mpts (single-channel <sup>[1]</sup> ), 10 Mpts (dual-channel <sup>[2]</sup> ), 1 Mpts (full-channel <sup>[3]</sup> )                |        |         |        |
| Max. Waveform Capture Rate                             | 30,000 wfms/s (Vector Mode)<br>1,000,000 wfms/s (UltraAcquire Mode)   |        |         |        |
| Vertical Resolution                                    | 12 bits   |        |         |        |
| Hardware Real-time Waveform Recording and Playing      | Max. 500,000 frames   |        |         |        |
| Peak Detection   | Capture 1.6 ns glitches   |        |         |        |
| LCD Size and Type                                      | 7" capacitive multi-touch screen  |        |         |        |
| Display Resolution                                     | 1024x600  |        |         |        |

## Vertical System Analog Channel

| Vertical System Analog Channel            |  |
|---|--|
| Input Coupling                            | DC, AC, or GND   |
| Input Impedance                           | 1 MΩ ± 1%  |
| Input Capacitance                         | 15 pF ± 3 pF   |
| Probe Attenuation Coefficient             | 0.001X, 0.002X, 0.005X, 0.01X, 0.02X, 0.05X, 0.1X, 0.2X, 0.5X, 1X, 2X, 5X, 10X, 15X, 20X, 50X, 100X, 150X, 200X, 500X, 1000X, 1500X, 2000X, 5000X, 10000X, 15000X, 20000X, and 50000X                      |
| Maximum Input Voltage                     | CAT I 300 V <sub>rms</sub> , 400 V <sub>pk</sub> (DC + V <sub>peak</sub> )   |
| Remarks                                   | Whether the probe is used or not, the transient overvoltage is not allowed to occur.<br>Please use the instrument dedicated for the specified measurement category (not applicable to CAT II, III, and IV) |
| Vertical Resolution                       | 12 bits  |
| Vertical Sensitivity Range <sup>[4]</sup> | 500 μV/div to 10 V/div   |
| Offset Range                              | ±0.5 V (<500 μV/div)<br>±1 V (≥500 μV/div, ≤65 mV/div)<br>±8 V (>65 mV/div, ≤270 mV/div)<br>±20 V (>270 mV/div, ≤2.75 V/div)<br>±100 V (>2.75 V/div, ≤10 V/div)  |
| Dynamic Range                             | ±4 div (12 bits)   |
| Bandwidth Limit (Typical)                 | 20 MHz, FULL; selectable for each channel  |
| DC Gain Accuracy <sup>[4]</sup>           | ± 1% (>5mV/div, FullScale)<br>± 2% (≤5mV/div, FullScale, Typ.)   |
| DC Offset Accuracy                        | ≤200 mV/div (±0.1 div ± 2 mV ± 1.5% of offset value)<br>>200 mV/div (±0.1 div ± 2 mV ± 1.0% of offset value)   |
| Channel-to-Channel Isolation              | ≥100:1   |
| ESD Tolerance                             | ±8 kV (on input BNCs)  |

## Horizontal System--Analog Channel

| Horizontal System--Analog Channel                        |              |  |
|--|--------------|--|
| Range of Time Base                                       |              | 5 ns/div to 500 s/div  |
|  |              | Fine   |
| Time Base Resolution                                     |              | 100 ps   |
| Time Base Accuracy                                       |              | $\pm 25$ ppm $\pm 5$ ppm/year  |
| Time Base Delay Range                                    | Pre-trigger  | -5 div   |
|  | Post-trigger | 1 s or 100 div, whichever is greater   |
| Delta Time Accuracy                                      |              | $\pm(\text{Time Base Accuracy} \times \text{Readout}) \pm (0.001 \times \text{Screen Width})$<br>$\pm 20$ ps   |
| Channel-to-Channel Skew Correction                       |              | $\pm 100$ ns, Accuracy $\pm 1$ ps  |
| Analog Channel-to-Channel Delay (Typical) <sup>[5]</sup> |              | $\leq 2$ ns  |
| Horizontal Mode  | YT           | Default  |
|  | XY           | Channel 1/2/3/4  |
|  | SCAN         | Time base $\geq 200$ ms/div  |
|  | ROLL         | Time base $\geq 50$ ms/div, available to enter or exit the ROLL mode by adjusting the horizontal timebase knob |

## Acquisition System

| Acquisition System                  |  |
|-------------------------------------|--|
| Max. Sample Rate of Analog Channel  | Two-channel model:<br>1.25 GSa/s (single-channel <sup>[1]</sup> ), 625 MSa/s (full-channel <sup>[3]</sup> )  |
|                                     | four-channel model:<br>1.25 GSa/s (single-channel <sup>[1]</sup> ), 625 MSa/s (dual-channel <sup>[2]</sup> ), 312.5 MSa/s (full-channel <sup>[3]</sup> ) |
| Max. Memory Depth of Analog Channel | Two-channel model:<br>25 Mpts (dual-channel <sup>[2]</sup> ), 10 Mpts (full-channel <sup>[3]</sup> )   |
|                                     | four-channel model:<br>25 Mpts (single-channel <sup>[1]</sup> ), 10 Mpts (dual-channel <sup>[2]</sup> ), optional: 1 Mpts (full-channel <sup>[3]</sup> ) |

## Acquisition System

|                  |                |   |
|------------------|----------------|---|
|                  | Normal         | Default   |
| Acquisition Mode | Peak Detection | Capture 1.6 ns glitches                             |
|                  | Average Type   | 2, 4, 8, 16...65536 are available for you to choose |
|                  | UltraAcquire   | Waveform capture rate up to 1,000,000 wfms/s        |

## Trigger System

### Trigger System

|                     |   |  |
|---------------------|---|--|
| Trigger Source      | Analog channel (CH1 to CH4), EXT TRIG <sup>[6]</sup>                                |  |
| Trigger Mode        | Auto, Normal, Single  |  |
| Trigger Coupling    | DC  | DC coupling trigger                                  |
|                     | AC  | AC coupling trigger                                  |
|                     | High Frequency Rejection  | Cut-off frequency to 120 kHz (internal trigger only) |
|                     | Low Frequency Rejection   | Cut-off frequency to 120 kHz (internal trigger only) |
| Noise Rejection     | Increases delay for the trigger circuit (internal trigger only), On/Off             |  |
| Holdoff Range       | 8 ns to 10 s  |  |
| Trigger Bandwidth   | Internal trigger: analog bandwidth of the oscilloscope                              |  |
| Trigger Sensitivity | Internal trigger: 0.5 div, $\geq 50$ mV/div; 0.7 div (with noise rejection enabled) |  |
|                     | External trigger <sup>[6]</sup> : 500 mVpp (DC to 100 MHz)                          |  |
| Trigger Level Range | Internal trigger: $\pm 4.5$ div from the center of the screen                       |  |
|                     | External trigger <sup>[6]</sup> : $\pm 5$ V   |  |

## Trigger Type

| Trigger Type |   |
|--------------|---|
| Trigger Type | Edge trigger, Pulse trigger, Slope trigger, Video trigger, Pattern trigger, Duration trigger, Timeout trigger, Runt trigger, Window trigger, Delay trigger, Setup/Hold trigger, Nth Edge trigger, RS232/UART, I2C, SPI  |
| Edge         | Triggers on the threshold of the specified edge of the input signal. The edge types can be Rising, Falling, or Either.<br>Source channel: CH1 to CH4, and EXT <sup>[6]</sup>  |
| Pulse        | Triggers on the positive or negative pulse with a specified width. The pulse width is greater or smaller than a certain value or within a certain time range.<br>Source channel: CH1 to CH4   |
| Slope        | Triggers on the positive or negative slope of the specified time. The slew time is greater or smaller than a certain value or within a certain time range.<br>Source channel: CH1 to CH4  |
| Video        | Triggers on all lines, specified line, odd field, or even field that conforms to the video standards. The supported video standards include NTSC, PAL/SECAM, 480p/60Hz, 576p/50Hz, 720p/60Hz, 720p/50Hz, 720p/30Hz, 720p/25Hz, 720p/24Hz, 1080p/60Hz, 1080p/50Hz, 1080p/30Hz, 1080p/25Hz, 1080p/24Hz, 1080i/60Hz, and 1080i/50Hz.<br>Source channel: CH1 to CH4 |
| Pattern      | Identifies a trigger condition by searching for a specified pattern. The pattern is a combination of multiple selected channel sources. The logic pattern of each channel is H, L, X, Rising, or Falling.<br>Source channel: CH1 to CH4   |
| Duration     | Triggers when the specified pattern meets the specified duration condition. The pattern is a combination of multiple selected channel sources. The logic pattern of each channel is H, L, and X. The duration is greater or smaller than a certain value, or within a certain time range, or outside a certain time range.<br>Source channel: CH1 to CH4        |
| Timeout      | Triggers when duration of a certain event exceeds the specified time. The event can be specified as Rising, Falling, or Either.<br>Source channel: CH1 to CH4   |
| Runt         | Triggers when the pulses pass through one threshold but fail to pass through another threshold.<br>Source channel: CH1 to CH4   |
| Window       | Triggers in a specified window state when the rising edge of the signal crosses the upper threshold or the falling edge crosses the lower threshold. The window state can be Enter, Exit, or Time.<br>Source channel: CH1 to CH4  |

## Trigger Type

|            |   |
|------------|---|
| Delay      | Triggers when the time difference between the specified edges of Source A and Source B meets the preset time. The duration is greater or smaller than a certain value, or within a certain time range, or outside a certain time range.<br>Source channel: CH1 to CH4 |
| Setup/Hold | When the setup time or hold time between the input clock signal and the data signal is smaller than the specified time.<br>Source channel: CH1 to CH4   |
| Nth Edge   | Triggers on the Nth edge that appears after the specified idle time. The edge can be specified as Rising or Falling.<br>Source channel: CH1 to CH4  |
| RS232/UART | Triggers on the Start, Error, Check Error, or Data frame of the RS232/UART bus (up to 20 Mb/s).<br>Source channel: CH1 to CH4   |
| I2C        | Triggers on the Start, Stop, Restart, MissedACK, Address (7 bits, 8 bits, or 10 bits), Data, or Address Data of the I2C bus.<br>Source channel: CH1 to CH4  |
| SPI        | Triggers on the specified pattern of the specified data width (4 to 32) of SPI bus. CS <sup>[7]</sup> and Timeout are supported.<br>Source channel: CH1 to CH4  |

## Search&Navigation

### Search&Navigation

|                |  |
|----------------|--|
| Type           | Edge, Pulse  |
| Source         | Analog channel   |
| Copy           | Copies the search settings from or to the trigger settings mutually, including threshold setting and search condition settings |
| Result Display | Displays in event table form; can be exported to the external or internal memory   |
| Navigation     | Time navigation: navigates to the acquired waveforms in time order.  |
|                | Event navigation: uses the navigation keys to scroll through the event search results and navigates to the specified event.    |
|                | Frame navigation: navigates to the specified frame segment in UltraAcquire mode.   |



# Waveform Measurement

| Waveform Measurement |                            |   |
|----------------------|----------------------------|---|
| Cursor               | Number of Cursors          | 2 pairs of XY cursors   |
|                      | Manual Mode                | Voltage deviation between cursors ( $\Delta Y$ )<br>Time deviation between cursors ( $\Delta X$ )<br>Reciprocal of $\Delta X$ (Hz) ( $1/\Delta X$ )   |
|                      | Track Mode                 | Fixes Y-axis to track X-axis waveform point's voltage and time values<br>Fixes X-axis to track Y-axis waveform point's voltage and time values  |
|                      | Auto Measurement           | Allows to display cursors during auto measurement   |
|                      | XY Mode                    | Measures the voltage parameters of the corresponding channel waveforms in XY time base mode.<br>X = Channel 1, Y = Channel 2  |
| Auto Measurement     | Number of Measurements     | 41 auto measurements; and up to 10 measurements can be displayed at a time.   |
|                      | Measurement Source         | CH1 to CH4, Math1 to Math4  |
|                      | Measurement Range (Region) | Main, Zoom  |
|                      | All Measurement            | Displays 33 measurement items (vertical and horizontal) for the current measurement channel; the measurement results are updated continuously.  |
|                      | Vertical                   | Vmax, Vmin, Vpp, Vtop, Vbase, Vamp, Vupper, Vmid, Vlower, Vavg, VRMS, Per. VRMS, Overshoot, Preshoot, Area, and Period Area.  |
|                      | Horizontal                 | Period, Frequency, Rise Time, Fall Time, +Width, -Width, +Duty, -Duty, Positive Pulse Count, Negative Pulse Count, Rising Edge Count, Falling Edge Count, Tvmax, Tvmin, +Slew Rate, and - Slew Rate |
|                      | Others                     | Delay(A↑-B↑), Delay(A↑-B↓), Delay(A↓-B↑), Delay(A↓-B↓), Phase(A↑-B↑), Phase(A↑-B↓), Phase(A↓-B↑), and Phase(A↓-B↓)  |

## Waveform Calculation

| Waveform Calculation  |   |   |
|-----------------------|---|---|
| No. of Math Functions | 4 math functions available to be displayed at a time  |   |
| Operation             | A+B, A-B, A×B, A/B, FFT, A&&B, A  B, A^B, !A, Intg, Diff, Sqrt, Lg, Ln, Exp, Abs, AX+B, LowPass, HighPass, BandPass, and BandStop |   |
| Color Grade           | Supports FFT  |   |
| FFT                   | Record Length   | Max. 1 Mpts (The max. number of the points to be analyzed for the FFT operation is 1 Mpts.) |
|                       | Window Type   | Rectangular, Blackman-Harris, Hanning (default), Hamming, Flattop, and Triangle.            |
|                       | Peak Search   | A maximum of 15 peaks, determined by the user-defined threshold and offset threshold        |

## Waveform Analysis

| Waveform Analysis  |  |  |
|--------------------|--|--|
| Waveform Recording | Stores the signal under test in segments according to the trigger events, that is, saves all the sampled waveform data as a segment to the RAM for each trigger event. The maximum number of the sampled segments reaches 500,000.             |  |
|                    | Source   | All enabled analog channels  |
|                    | Analysis   | Support playing frame by frame or continuous playing; capable of calculating, measuring, and decoding the played waveforms |
| PassFail           | Compares the signal under test with the user-defined mask to provide the test results: the number of successful tests, failed tests, and the total number of tests. The pass/fail event can enable immediate stop, beeper, and the screenshot. |  |
|                    | Source   | Any analog channel   |

## Waveform Analysis

The waveform histogram provides a group of data, showing the number of times a waveform hits within the defined region range on the screen. The waveform histogram not only shows the distribution of hits, but also the ordinary measurement statistics.

|           |               |  |
|-----------|---------------|--|
| Histogram | Source        | Any analog channel, auto measurement item  |
|           | Type          | Horizontal, vertical, and measure  |
|           | Measure       | Statistics: Sum, Peaks, Max, Min, Pk_Pk<br>Histogram: Mean, Median, Mode, Bin width, Sigma, and XScale |
|           | Sampling Mode | Supports all modes, except the Zoom, XY, and ROLL modes  |

Provides a dimensional view for waveform intensity, color grade > 16, 256-level color scale display

|             |               |                           |
|-------------|---------------|---------------------------|
| Color Grade | Source        | Any analog channel        |
|             | Color Theme   | Temperature and intensity |
|             | Sampling Mode | Supports all modes        |

## Serial Decoding

### Serial Decoding

|                     |   |
|---------------------|---|
| Number of Decodings | 4 protocol types can be decoded and enabled at the same time  |
| Decoding Type       | Standard: Parallel, RS232/UART, I2C, SPI  |
| Parallel            | Up to 4 bits of Parallel decoding, supporting any analog channel Support user-defined clock and auto clock settings.<br>Source channel: CH1 to CH4      |
| RS232/UART          | Decodes the RS232/UART (up to 20 Mb/s) bus's TX/RX data (5-9 bits), parity (Odd, Even, or None), and stop bits (1-2 bits)<br>Source channel: CH1 to CH4 |
| I2C                 | Decodes the address (with or without the R/W bit) of the I2C bus, data, and ACK.<br>Source channel: CH1 to CH4  |

## Serial Decoding

|     |  |
|-----|--|
| SPI | Decodes the MISO/MOSI data (4-32 bits) of the SPI bus. The available mode includes "Timeout" and "CS" <sup>[7]</sup> .<br>Source channel: CH1 to CH4 |
|-----|--|

## Auto

### Auto

|           |   |
|-----------|---|
| AutoScale | Min voltage > 10 mVpp, duty cycle > 1%, frequency > 35 Hz |
|-----------|---|

## Digital Voltmeter

### Digital Voltmeter

|               |  |
|---------------|--|
| Source        | Any analog channel   |
| Function      | DC, AC+DC <sub>rms</sub> , AC <sub>rms</sub>                                   |
| Resolution    | ACV/DCV: 3 digits  |
| Limits Beeper | Sounds an alarm when the voltage value is within or outside of the limit range |

## High-precision Frequency Counter

### High-precision Frequency Counter

|                |   |                          |
|----------------|---|--------------------------|
| Source         | Any analog channel and EXT <sup>[6]</sup> |                          |
| Measure        | Frequency, period, totalizer              |                          |
| Counter        | Resolution                                | 3-6 digits, user-defined |
|                | Max. Frequency                            | Max. analog bandwidth    |
| Totalizer      | 48-bit totalizer                          |                          |
|                | Counts the number of the rising edges     |                          |
| Time Reference | Internal reference                        |                          |

## Command Set

### Command Set

|                          |                    |
|--------------------------|--------------------|
| Common Commands Support  | IEEE488.2 Standard |
| Error Message Definition | Error messages     |

## Command Set

|                                 |                  |
|---------------------------------|------------------|
| Support Status Report Mechanism | Status Reporting |
| Support Syn Mechanism           | Synchronization  |

## Display

### Display

|             |   |
|-------------|---|
| LCD         | 7-inch capacitive multi-touch screen, gesture enabled operation |
| Resolution  | 1024×600 (Screen Region) 16:9                                   |
| Graticule   | 10 horizontal divisions x 8 vertical divisions                  |
| Persistence | Off, Infinite, variable persistence (100 ms to 10 s)            |
| Brightness  | 256 intensity levels (LCD, HDMI)                                |

## Processor System

### Processor System

|                              |  |
|------------------------------|--|
| Processor                    | Cortex-A72 up to 1.8 GHz, 6-core processor |
| System Memory                | 4 GB RAM                                   |
| Operating System             | Android                                    |
| Internal Non-volatile Memory | 8 GB                                       |

## I/O

### I/O

|  |   |
|--|---|
| USB2.0 Host                                | 1 on the front panel  |
| USB2.0 Device                              | 1 on the rear panel   |
| LAN  | 1 on the rear panel, 10/100 Base-T, supporting LXI-C  |
| Web Remote Control                         | Supports Web Control interface (input the IP address of the oscilloscope into the Web browser to display the operation interface of the oscilloscope) |
| EXT Interface <sup>[6]</sup> Trigger Input | 1 on the front panel, BNC connector   |

## I/O

|                           |                  |  |
|---------------------------|------------------|--|
| AUX OUT                   | Output Interface | 1 on the rear panel, BNC connector<br>$V_o(H) \geq 2.5\text{ V}$ open circuit, $\geq 1.0\text{ V}$ $50\ \Omega$ to GND<br>$V_o(L) \leq 0.7\text{ V}$ to load $\leq 4\text{ mA}$ , $\leq 0.25\text{ V}$ $50\ \Omega$ to GND |
|                           | Trigger Output   | Outputs a pulse signal when the oscilloscope is triggered  |
|                           | Pass/Fail        | Output a pulse signal when a pass/fail event occurs.<br>Supports user-defined pulse polarity and pulse time (100 ns to 10 ms)  |
| HDMI                      | Video Output     | 1 on the rear panel, HDMI 1.4, A plug. It is used to connect to an external monitor or projector   |
| Probe Compensation Output |                  | 1 kHz, 3 $V_{pp}$ square waveform  |

## Power Supply

### Power Supply

|                        |   |
|------------------------|---|
| Power Supply Interface | Type-C  |
| Power Voltage          | DC 12 V, 4 A  |
| Power                  | Max. 48 W (when connected to various interfaces, USB storage device, active probes) |

## Environment

### Environment

|                   |               |   |
|-------------------|---------------|---|
| Temperature Range | Operating     | 0°C to 50°C   |
|                   | Non-operating | -30°C to +60°C  |
| Humidity Range    | Operating     | below +30°C: $\leq 90\%$ RH (without condensation)    |
|                   |               | +30°C to +40°C, $\leq 75\%$ RH (without condensation) |
|                   | Non-operating | +40°C to +50°C, $\leq 45\%$ RH (without condensation) |
|                   |               | below 60°C: $\leq 90\%$ RH (without condensation)     |
| Altitude          | Operating     | below 3,000 m   |
|                   | Non-operating | Below 15,000 m  |



## Warranty and Calibration Interval

### Warranty and Calibration Interval

|          |  |
|----------|--|
| Warranty | Three years for the mainframe, excluding the probes and accessories. |
|----------|--|

|                                  |           |
|----------------------------------|-----------|
| Recommended Calibration Interval | 18 months |
|----------------------------------|-----------|

## Regulations

### Regulations

Compliant with EMC DIRECTIVE 2014/30/EU, compliant with or higher than the standards specified in IEC 61326-1:2013/EN 61326-1:2013 Group 1 Class A

CISPR 11/EN 55011

|                                 |  |
|---------------------------------|--|
| IEC 61000-4-2:2008/EN 61000-4-2 | ±4.0 kV (contact discharge), ±8.0 kV (air discharge) |
|---------------------------------|--|

|                                 |   |
|---------------------------------|---|
| IEC 61000-4-3:2002/EN 61000-4-3 | 3 V/m (80 MHz to 1 GHz); 3 V/m (1.4 GHz to 2 GHz); 1 V/m (2.0 GHz to 2.7 GHz) |
|---------------------------------|---|

Electromagnetic Compatibility

|                                 |                 |
|---------------------------------|-----------------|
| IEC 61000-4-4:2004/EN 61000-4-4 | 1 kV power line |
|---------------------------------|-----------------|

|                                 |   |
|---------------------------------|---|
| IEC 61000-4-5:2001/EN 61000-4-5 | 0.5 kV (phase-to-neutral voltage); 1 kV (phase-to-earth voltage); 1 kV (neutral-to-earth voltage) |
|---------------------------------|---|

|                                 |                  |
|---------------------------------|------------------|
| IEC 61000-4-6:2003/EN 61000-4-6 | 3 V, 0.15-80 MHz |
|---------------------------------|------------------|

|                                   |   |
|-----------------------------------|---|
| IEC 61000-4-11:2004/EN 61000-4-11 | Voltage dip: 0% UT during half cycle; 0% UT during 1 cycle ; 70% UT during 25 cycles<br>short interruption: 0% UT during 250 cycles |
|-----------------------------------|---|

## Regulations

|           |   |
|-----------|---|
| Safety    | EN 61010-1:2019   |
|           | EN 61010-031:2015   |
|           | IEC 61010-1:2016  |
|           | IEC 61010-2-030:2017  |
|           | UL 61010-1:2012 R7  |
|           | UL 61010-2-31:2017 R2   |
|           | CAN/CSA-22.2 No. 61010-1-12:2017  |
|           | CAN/CSA-22.2 No. 61010-2-30:2018  |
|           | CAN/CSA-22.2 No. 61010-031-07:201   |
| Vibration | Meets GB/T 6587; class 2 random   |
|           | Meets MIL-PRF-28800F and IEC60068-2-6; class 3 random   |
| Shock     | Meets GB/T 6587-2012; class 2 random  |
|           | Meets MIL-PRF-28800F and IEC 60068-2-27; class 3 random   |
|           | In non-operating conditions: 30 g, half-sine wave, 11 ms duration, 3 shocks along the main axis, total of 18 shocks |

## Mechanical Characteristics

### Mechanical Characteristics

|                       |  |
|-----------------------|--|
| Dimensions            | 265.35 mm (W) x 161.75 mm (H) x 77.38 mm (D) |
| Weight <sup>[8]</sup> | Package excluded: 1.78 kg                    |
|                       | Package included: 2.78 kg                    |

## Non-volatile Memory

### Non-volatile Memory

|                    |               |   |
|--------------------|---------------|---|
|                    | Setup/Image   | setup (*.stp), image (*.png, *.bmp, *.jpg)  |
| Data/File Storage  | Waveform Data | CSV waveform data (*.csv), binary waveform data (*.bin), list data (*.csv), and reference waveform data (*.ref, *.csv, *.bin) |
| Internal Capacity  |               | 8 GB  |
| Reference Waveform |               | Displays 10 internal waveforms  |
| Setting            |               | Storage is limited by the capacity  |

## Non-volatile Memory

USB Capacity

Supports the USB storage device that conforms to the industry standard

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### Note:

[1]: Single-channel mode: If any one of the channels is enabled, it is called single-channel mode.

[2]: Dual-channel mode: For four-channel models, if any two of the channels are enabled, it is called dual-channel mode.

[3]: Full-channel mode: For two-channel models, if all of the two channels are enabled, it is called full-channel mode; for four-channel models, if any three channels or all of the four channels are enabled, it is called full-channel mode.

[4]: 500  $\mu\text{V}/\text{div}$  is a magnification of 1  $\text{mV}/\text{div}$  setting. For vertical accuracy calculations, use full scale of 8 mV.

[5]: For any channel, under the same input impedance with DC-coupled, the Volts/div setting is the same for 100  $\text{mV}/\text{div}$  and 200  $\text{mV}/\text{div}$ .

[6]: Only available for the two-channel models.

[7]: Only available for the four-channel models.

[8]: Standard configuration.

# Order Information and Warranty Period

## Order Information

| Order Information   | Order No. |
|---|-----------|
| <b>Model</b>  |           |
| 100 MHz, 1.25 GSa/s, 25 Mpts, 4CH                                   | DHO814    |
| 100 MHz, 1.25 GSa/s, 25 Mpts, 2CH                                   | DHO812    |
| 70 MHz, 1.25 GSa/s, 25 Mpts, 4CH                                    | DHO804    |
| 70 MHz, 1.25 GSa/s, 25 Mpts, 2CH                                    | DHO802    |
| <b>Standard Accessories</b>   |           |
| Power Adaptor Conforming to the Standard of the Destination Country | — —       |
| Banana-Plug Ground Connecting Cable                                 | — —       |
| DHO814/DHO804: Passive Probe x4 (150 MHz)                           | PVP3150   |
| DHO812/DHO802: Passive Probe x2 (150 MHz)                           |           |

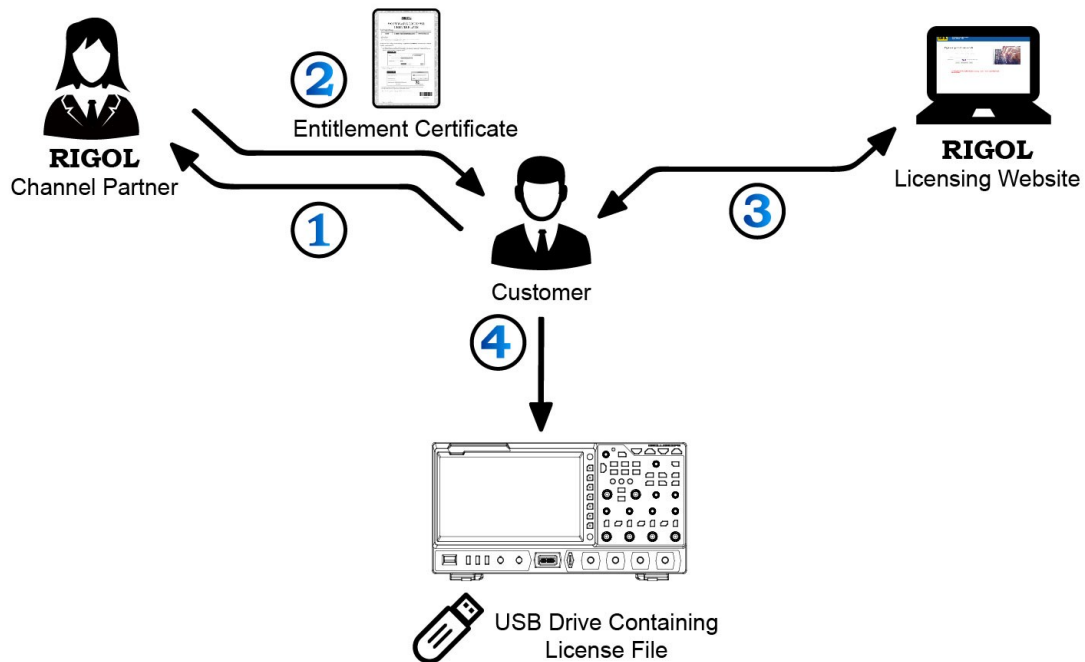
### NOTE:

For all the mainframes, accessories and options, please contact the local office of RIGOL.

## Warranty Period

Three years for the mainframe, excluding the probes and accessories.

# Option Ordering and Installation Process



1. According to the usage requirements, please purchase the specified function options from **RIGOL Sales Personnel**, and provide the serial number of the instrument that needs to install the option.
2. After receiving the option order, the **RIGOL** factory will mail the paper software product entitlement certificate to the address provided in the order.
3. Log in to **RIGOL** official website for registration. Use the software key and instruments serial number provided in the entitlement certificate to obtain the option license code and the option license file.
4. Download the option license file to the root directory of the USB storage device, and connect the USB storage device to the instrument properly. After the USB storage device is successfully recognized, the **Option install** menu is activated. Press this menu key to start installing the option.

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