Enhance your troubleshooting capability at an affordable price

The HP 54600 family of oscilloscopes provide the familiar, easy-to-use controls and interactive displays you’ve grown accustomed to on analog scopes. Yet, to solve your most difficult test problems, these scopes provide powerful digital features, such as pre-trigger viewing, waveform storage, and measurement automation. The eight models in this family give you the features and performance you need for confidence in your critical measurements, at a fraction of the price you’d expect to pay.

Displays you can trust

HP 54600-series oscilloscopes feature real-time vector displays that give you a clear and accurate picture of your waveforms. Like analog oscilloscope displays, these enhanced displays give you waveform slew rate information at a glance, with brighter traces representing more slowly changing waveforms and dimmer traces representing more rapidly changing waveforms. These trace intensity differences give you the visual information you need to quickly assess waveform slew rate, for faster, more effective troubleshooting.

The multi-processor architecture of HP 54600-series oscilloscopes delivers a display update rate of over 500,000 points per second (up to 3 million points per second on the HP 54645A). This fast display update means the oscilloscope screen reflects changes in the waveform instantaneously, giving you the display responsiveness you need to make adjustments quickly and see complex waveforms accurately.

In vector mode, HP 54600-series oscilloscopes, provide a fast screen refresh rate of 60 times/second, regardless of the number of waveforms displayed, and minimal display blind time so you can capture and display infrequent events that other scopes might miss.

Powerful digital features

The digital architecture of HP 54600-series oscilloscopes gives you a multitude of features that help you get your job done easier and faster:

• Pre-trigger viewing capability lets you view events that you’d miss with an analog scope. This feature lets you see what happened before the trigger event, so you can troubleshoot more effectively.
• Autoscale frees you from resetting the scope every time you move the probe from test point to test point. You simply hit the autoscale button and it sets voltage, time and trigger parameters for you.
With autostore, the waveform displays at full brightness while all previously acquired waveforms remain on the scope’s screen at half brightness. This lets you see a history of waveform activity while simultaneously viewing the live waveform. You can use this tool to analyze worst-case jitter and noise, or to permanently capture infrequent waveform anomalies.

Automatic measurements of voltage, frequency and time, plus user-defined cursor measurements, make waveform characterization fast and easy.

With peak detect, you won’t have to worry about missing narrow glitches.

Choose from models designed to meet your needs

The HP 54600 series includes eight models designed to meet your needs and your budget.

**HP 54600B 100 MHz oscilloscope**

With 100 MHz bandwidth, two input channels and sweep speeds from 2ns/div to 5 s/div, the HP 54600B is ideal for production, test, field service and education, or anywhere you need a solid, dependable scope.

**HP 54645A MegaZoom oscilloscope**

The HP 54645A oscilloscope brings the advantages of deep memory with none of the disadvantages usually associated with this class of oscilloscopes. The HP 54645A is a dual-channel 100 MHz oscilloscope with 200 MSa/s and a full 1 MB of memory behind each of its channels. Through the application of MegaZoom technology, this deep memory oscilloscope has a high speed/low dead time display and a highly responsive front panel. Unlike all other deep memory scopes which force the user to choose between fast response and deep memory, the MegaZoom technology gives you a scope that is always fast and deep. Pan and zoom operation is as simple as turning the time/division knob. No special menus or controls are required to take full advantage of the HP 54645A’s deep memory.

A powerful glitch trigger extends the power of the MegaZoom technology in solving your toughest troubleshooting problems. Simply set-up the desired pulse width that represents a worse case situation and after the scope finds it, pan and zoom through the deep waveform record to find out exactly what was going on in your circuit that caused the problem.

**HP 54602B 4-channel oscilloscope**

When you need more bandwidth than the HP 54600B and HP 54645A provide, take a closer look at the HP 54602B scope. You get the same capabilities as with the HP 54600B but with the added advantage of a 150 MHz bandwidth, 4 (2+2) channels and 1mV/div sensitivity.

**HP 54603B 60 MHz oscilloscope**

For colleges and universities with tight budgets, this scope is a great way to introduce students to the world of professional test equipment. Students can use the 60 MHz, 2-channel HP 54603B to understand circuit operation and learn standard measurement practices on the same type of equipment they are likely to use when they graduate. Sweep speed varies from 5 ns/div to 5s/div.

**HP 54610B 500 MHz oscilloscope**

Even though the HP 54610B is the least expensive 500 MHz oscilloscope on the market, it has analog performance that is similar to higher cost oscilloscopes. The HP 54610B is ideal for many production line test applications. This 2-channel, delayed sweep scope offers a viewable external trigger and horizontal accuracy of +0.001%. Sweep speeds range from 1ns/div to 5s/div.

**HP 54615B 1 GSa/s oscilloscope**

With the HP 54615B you can capture narrow glitches and subtle details of your signal. This 2-channel scope combines 500 MHz bandwidth, 1 GSa/s sample rate and 1 nanosecond peak detection on both channels. The HP 54615B peak detection allows the scope to maintain a 1 GSa/s sample rate at all sweep speeds. A horizontal accuracy of 0.005% means you can make critical timing measurements with confidence.

**HP 54616B 2 GSa/s oscilloscope**

The top-of-the line HP 54616B offers the same benefits as the 54615B but with twice the sample rate—2GSa/s sampling rate, 500 MHz bandwidth and 1 nanosecond peak detection. Whether you need to verify a one time, 1 ns edge or view the envelope of a modulated waveform, the HP 54616B has the power and flexibility to get the job done. And, the intuitive front panel and responsive display makes this the scope of choice for everyday troubleshooting.

**HP 54616C color oscilloscope**

The HP 54616C color display makes viewing more interesting and easier when you are viewing multiple waveforms.

**3-year warranty**

All HP 54600-series oscilloscopes include a full 3-year warranty with optional 5-year warranty coverage. Each scope includes two 1.5 meter 10X voltage probes, a user’s guide, and a power cord.
### HP 54600B, HP 54602B, HP 54603B, HP 54610B, HP 54615B, HP 54645A and HP 54616B/C Oscilloscopes

<table>
<thead>
<tr>
<th>Specification</th>
<th>HP 54603B</th>
<th>HP 54600B</th>
<th>HP 54645A</th>
<th>HP 54602B</th>
<th>HP 54610B</th>
<th>HP 54615B/16B/16C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bandwidth</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ch 1 &amp; 2</td>
<td>dc–60 MHz</td>
<td>dc–100 MHz</td>
<td>dc–100 MHz</td>
<td>dc–150 MHz</td>
<td>dc–500 MHz</td>
<td>dc–500 MHz</td>
</tr>
<tr>
<td>Ch 3 &amp; 4</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Single-shot bandwidth</td>
<td>dc–2 MHz</td>
<td>dc–2 MHz</td>
<td>dc–20 MHz</td>
<td>dc–2 MHz</td>
<td>dc–2 MHz</td>
<td>HP 54615B 250 MHz</td>
</tr>
<tr>
<td>Number of channels</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>4 (2 + 2)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td><strong>Sensitivity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ch 1 &amp; 2</td>
<td>2 mV/div to 5 V/div</td>
<td>2 mV/div to 5 V/div</td>
<td>1 mV/div to 5 V/div</td>
<td>1 mV/div to 5 V/div</td>
<td>2 mV/div to 5 V/div</td>
<td>2 mV/div to 5 V/div</td>
</tr>
<tr>
<td>Ch 3 &amp; 4</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td><strong>dc gain accuracy</strong></td>
<td>±2%</td>
<td>±1.5%</td>
<td>±1.5%</td>
<td>±1.5%</td>
<td>±2%</td>
<td>±2%</td>
</tr>
<tr>
<td><strong>Rise time (calculated)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ch 1 &amp; 2</td>
<td>&lt;5.83 ns</td>
<td>&lt;3.5 ns</td>
<td>&lt;3.5 ns</td>
<td>&lt;2.33 ns</td>
<td>&lt;700 ps</td>
<td>&lt;700 ps</td>
</tr>
<tr>
<td>Ch 3 &amp; 4</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Input impedance</strong></td>
<td>1 MΩ, approx. 13 pF</td>
<td>1 MΩ, approx. 13 pF</td>
<td>1 MΩ, approx. 13 pF</td>
<td>1 MΩ, approx. 13 pF</td>
<td>1 MΩ, approx. 9 pF or 50 Ω selectable</td>
<td>1 MΩ, approx. 9 pF or 50 Ω selectable</td>
</tr>
<tr>
<td><strong>Input coupling</strong></td>
<td>dc, ac or ground</td>
<td>dc, ac or ground</td>
<td>dc, ac or ground</td>
<td>dc, ac or ground</td>
<td>dc, ac or ground</td>
<td>dc, ac or ground</td>
</tr>
<tr>
<td>Maximum input (dc + peak ac)</td>
<td>400 V</td>
<td>400 V</td>
<td>400 V</td>
<td>400 V</td>
<td>250 V or 5 Vrms in 50 Ω mode</td>
<td>250 V or 5 Vrms in 50 Ω mode</td>
</tr>
<tr>
<td><strong>Timebase range (main &amp; delayed)</strong></td>
<td>5 s/div to 5 ns/div</td>
<td>5 s/div to 2 ns/div</td>
<td>50 s/div to 2 ns/div</td>
<td>5 s/div to 2 ns/div</td>
<td>5 s/div to 1 ns/div</td>
<td>5 s/div to 1 ns/div</td>
</tr>
<tr>
<td><strong>Trigger sources</strong></td>
<td>Ch 1, 2, line, or ext.</td>
<td>Ch 1, 2, line, or ext.</td>
<td>Ch 1, 2, line, or ext.</td>
<td>Ch 1, 2, 3, 4, or line</td>
<td>Ch 1, 2, line, or ext.</td>
<td>Ch 1, 2, line, or ext.</td>
</tr>
<tr>
<td><strong>Horizontal accuracy</strong></td>
<td>±0.01%</td>
<td>±0.01%</td>
<td>±0.01%</td>
<td>±0.01%</td>
<td>±0.01%</td>
<td>±0.005%</td>
</tr>
<tr>
<td><strong>Horizontal resolution</strong></td>
<td>100 ps</td>
<td>100 ps</td>
<td>40 ps</td>
<td>100 ps</td>
<td>100 ps</td>
<td>20 ps</td>
</tr>
<tr>
<td><strong>Trigger sensitivity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dc to max. bandwidth</td>
<td>0.35 div or 3.5 mV</td>
<td>0.35 div or 3.5 mV</td>
<td>0.35 div or 3.5 mV</td>
<td>0.35 div or 0.7 mV</td>
<td>0.5 div or 2.5 mV***</td>
<td>0.5 div or 3.5 mV***</td>
</tr>
<tr>
<td>dc to max. bandwidth</td>
<td>1 div or 10 mV</td>
<td>1 div or 10 mV</td>
<td>1 div or 10 mV</td>
<td>1 div or 2 mV***</td>
<td>1 div or 5 mV</td>
<td>1 div or 7 mV***</td>
</tr>
<tr>
<td><strong>Maximum sample rate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>single shot</td>
<td>20 M Sa/s</td>
<td>20 M Sa/s</td>
<td>200 M Sa/s</td>
<td>20 M Sa/s</td>
<td>20 M Sa/s</td>
<td>HP 54615 1 GSa/s</td>
</tr>
<tr>
<td>repetitive</td>
<td>10 GSa/s</td>
<td>10 GSa/s</td>
<td>&gt;10 GSa/s</td>
<td>10 GSa/s</td>
<td>10 GSa/s</td>
<td>HP 54616 2 GSa/s</td>
</tr>
<tr>
<td>Record length (maximum)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>single shot</td>
<td>4,000 points</td>
<td>4,000 points</td>
<td>1M points</td>
<td>4,000 points</td>
<td>4,000 points</td>
<td>5,000 points</td>
</tr>
<tr>
<td>Max. display update rate</td>
<td>1,500,000 points/sec</td>
<td>1,500,000 points/sec</td>
<td>3,000,000 points/sec</td>
<td>1,500,000 points/sec</td>
<td>1,500,000 points/sec</td>
<td>500,000 points/sec</td>
</tr>
<tr>
<td>Resolution</td>
<td>8 bits</td>
<td>8 bits</td>
<td>8 bits</td>
<td>8 bits</td>
<td>8 bits</td>
<td>8 bits</td>
</tr>
<tr>
<td><strong>Net weight</strong></td>
<td>Approx. 6.2 kg (14 lbs)</td>
<td>Approx. 6.2 kg (14 lbs)</td>
<td>Approx. 6.2 kg (14 lbs)</td>
<td>Approx. 6.2 kg (14 lbs)</td>
<td>Approx. 6.2 kg (14 lbs)</td>
<td>Approx. 6.2 kg (14 lbs)</td>
</tr>
<tr>
<td><strong>Size (excl. handle)</strong></td>
<td>172 mm H x 322 mm W x 317 mm D (6.8 x 12.7 x 12.5 in)</td>
<td>172 mm H x 322 mm W x 317 mm D (6.8 x 12.7 x 12.5 in)</td>
<td>172 mm H x 322 mm W x 317 mm D (6.8 x 12.7 x 12.5 in)</td>
<td>172 mm H x 322 mm W x 317 mm D (6.8 x 12.7 x 12.5 in)</td>
<td>172 mm H x 322 mm W x 317 mm D (6.8 x 12.7 x 12.5 in)</td>
<td>172 mm H x 322 mm W x 317 mm D (6.8 x 12.7 x 12.5 in)</td>
</tr>
<tr>
<td><strong>Warranty</strong></td>
<td>3 years</td>
<td>3 years</td>
<td>3 years</td>
<td>3 years</td>
<td>3 years</td>
<td>3 years</td>
</tr>
</tbody>
</table>

* Maximum bandwidth on CH 1 & 2 is 100 MHz at 1, 2, and 5 mV/div.
** HP 54602B, for ranges 1, 2, and 5 mV/div, sensitivity between 25 MHz and 100 MHz on CH 1 & 2 is 2 div or 4 mV.
*** Trigger sensitivity from dc to 100 MHz.
†† Maximum bandwidth on CH 1 & 2 is 75 MHz at 1, 2 and 5 mV/div.
††† Trigger sensitivity from 100 kHz to max. bandwidth.
<table>
<thead>
<tr>
<th>Vertical System (HP 54600B, 54645A, 54602B, 54603B)</th>
<th>Horizontal System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bandwidth Limit</td>
<td>≈ 20 MHz</td>
</tr>
<tr>
<td>Inversion</td>
<td>CH 1 &amp; CH 2</td>
</tr>
<tr>
<td>CMRR</td>
<td>≈ 20 dB at 50 MHz</td>
</tr>
<tr>
<td>Dynamic Range</td>
<td>± 8 div from center screen</td>
</tr>
<tr>
<td>Input R&amp;C</td>
<td>1 M Ω, ~ 13 pf</td>
</tr>
<tr>
<td>Maximum Input</td>
<td>400 V (dc + peak ac)</td>
</tr>
<tr>
<td>Math Functions</td>
<td>CH 1 + CH 2</td>
</tr>
<tr>
<td>Cursor Accuracy</td>
<td>(At &amp; 1/Δt) [3]</td>
</tr>
<tr>
<td>Single Cursor</td>
<td>Vert. Acc. ± 1.2% of full scale, ± 0.5% of position value</td>
</tr>
<tr>
<td>Dual Cursor</td>
<td>Vert. Acc. ± 0.4% of full scale</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vertical System (HP 54610B, 54615B, 54616B/C)</th>
<th>Delayed Sweep</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bandwidth Limit</td>
<td>≈ 30 MHz</td>
</tr>
<tr>
<td>Inversion</td>
<td>CH 1 &amp; CH 2</td>
</tr>
<tr>
<td>CMRR</td>
<td>&gt; 20 dB at 50 MHz</td>
</tr>
<tr>
<td>Dynamic Range</td>
<td>± 12 div from center screen</td>
</tr>
<tr>
<td>Input R&amp;C</td>
<td>1 M Ω, ~ 9 pf or 50Ω selectable</td>
</tr>
<tr>
<td>Maximum Input</td>
<td>250 V (dc + peak ac) or 5 Vrms in 50Ω mode</td>
</tr>
<tr>
<td>50Ω Protection</td>
<td>Protects 50Ω load from excessive voltage</td>
</tr>
<tr>
<td>Time Skew</td>
<td>Adjustable over a range of ±25ns to remove effects of cabling</td>
</tr>
<tr>
<td>Probe Sense</td>
<td>Automatic readout of 1X, 10X, 20X, 50X and 100X probes</td>
</tr>
<tr>
<td>Math Functions</td>
<td>CH 1 + or - CH 2</td>
</tr>
<tr>
<td>Cursor Accuracy</td>
<td>1[2]</td>
</tr>
<tr>
<td>Single Cursor</td>
<td>Vert. Acc. ± 1.2% of full scale, ± 0.5% of position value</td>
</tr>
<tr>
<td>Dual Cursor</td>
<td>Vert. Acc. ± 0.4% of full scale</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Horizontal System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cursor Accuracy</td>
</tr>
<tr>
<td>Delay jitter</td>
</tr>
<tr>
<td>Pretrigger Delay</td>
</tr>
<tr>
<td>Posttrigger Delay</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Delayed Sweep</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Sweep</td>
</tr>
<tr>
<td>Delayed Sweep</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trigger System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coupling</td>
</tr>
<tr>
<td>Modes</td>
</tr>
<tr>
<td>TV Triggering</td>
</tr>
<tr>
<td>TV Functions</td>
</tr>
<tr>
<td>Line Counting</td>
</tr>
<tr>
<td>Holdoff</td>
</tr>
<tr>
<td>External Trigger (54600B, 54603B, 54645A)</td>
</tr>
<tr>
<td>Range Sensitivity</td>
</tr>
<tr>
<td>Coupling</td>
</tr>
<tr>
<td>Input R&amp;C</td>
</tr>
<tr>
<td>Maximum Input</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Display System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display</td>
</tr>
<tr>
<td>Resolution</td>
</tr>
<tr>
<td>Controls</td>
</tr>
<tr>
<td>Autostore</td>
</tr>
<tr>
<td>Display (54616C)</td>
</tr>
<tr>
<td>5.8 inch Active M atrix Color LCD Display</td>
</tr>
</tbody>
</table>

[1] Temperature ±10°C from calibration
[2] Use full scale at 80mV for 2mV/div and 5 mV/div ranges
[3] Use full scale of 50 ns for 2 ns/div
### Acquisition System

#### Simultaneous Channels
- HP 54600B/54610B, 54615B, 54616B
- HP 54602B Channels 1 & 2 or 3 & 4
- HP 54615B, 54616B/C

#### Record Length
- HP 54615B, 54616B/C: 5,000 points
- HP 54645A: 1 million points

#### Max Update Rate
- Vectors off: 1,500,000 points/sec
- Vectors on: 60 full screens/sec, independent of number of waveforms being displayed
- HP 54615B, 54616B/C: 500,000 points/sec
- HP 54645A: 3,000,000 points/sec

#### Usable Single-Shot Bandwidth
- HP 54615B: 2 MHz, single channel
- HP 54615B/C: 1 MHz, dual channel
- HP 54645A: 500 MHz

#### Peak Detect
- HP 54615B, 54616B/C: 1 ns glitch capture
- HP 54645A: 5 ns

#### Average
- Number of averages selectable at 8, 64, 256

### General

#### Power Line Requirements
- Line Voltage Range: 100 Vac to 240 Vac
- Line Voltage Selection: Automatic
- Line Frequency: 45 Hz to 440 Hz
- Max Power: 220 VA
- Consumption: 300 VA (54615B, 54616B/C)

#### Environmental Characteristics
- The instrument meets the requirements of MIL-T-28800D for Type III, Class 3, Style D equipment as described below.

#### Ambient Temperature
- Operating: -10 °C to +55 °C
- Nonoperating: -51 °C to +71 °C

#### Humidity
- Operating: 95% RH at 40°C for 24 Hrs
- Nonoperating: 90% RH at 65°C for 24 Hrs

#### Altitude
- Operating: to 4,500 m (15,000 ft)
- Nonoperating: to 15,000 m (50,000 ft)

#### EMI (Commercial)
- Meets FTZ 1046 Class B

#### EMI (MIL-T-28800D)
- Meets requirements in accordance with Paragraph 3.8.3, EMI Type III, and MIL-STD-461C as modified by Table XII.

#### CE01, CE03
- Full limits

#### CS01, CS02, CS06
- Full limits of class A1c and A1f

#### RE01
- 15 dB relaxation to 20 kHz; exceptioned from 20 kHz to 50 kHz

#### RE02
- (With Opt 002) Full limits of class A1c and A1f
- (Without Opt 002) 10 dB relaxation from 14 kHz to 100 kHz

#### RS02
- Exceptioned

#### RS03
- (With Opt 001) Slight trace shift from 80 MHz to 200 MHz

#### Vibration
- Operating: 15 minutes along each of the 3 major axes; 0.025 inch p-p displacement, 10 Hz to 55 Hz in one-minute cycles. Held for 10 minutes at 55 Hz (4 g at 55 Hz).

#### Shock
- Operating: 30 g, 1/2 sine, 11 ms duration, 3 shocks per axis along major axis. Total of 18 shocks

#### Size (excluding handle)
- Height: 172 mm (6.8 in)
- Width: 322 mm (12.7 in)
- Depth: 317 mm (12.5 in)

#### Weight
- 6.2 kg (14 lbs)

#### Safety
- CSA Certification, IEC 348
- UL 1244 listed

#### Warranty
- 3 years

---

### Expandable feature set to meet your changing needs

HP 54600-series oscilloscopes can be easily and inexpensively upgraded with add-on modules and software links to provide advanced analysis capability. Accessories and modules available include:

- Interface modules for remote control and hard-copy output to RS-232, HP-IB and parallel printers and plotters. With the addition of these modules, the scope's two trace memories become nonvolatile.
- Add FFT capability and unattended signal monitoring along with the rest of the basic interface module benefits. Catching intermittent failures is easy with unattended waveform monitoring. The nonvolatile memory can store up to 100 traces.
- HP BenchLink Scope software for transferring screen images and waveform data to Windows applications for further analysis or to create polished reports and presentations. HP BenchLink Scope also lets you store instrument setups.

### Enhanced TV/video trigger

With Option 005, six of the HP 54600-series scopes gain the ability to trigger and perform highly detailed measurements on the video components of your system. You can order this option for HP 54602B, HP 54610B, HP 54615B, HP 54616B/C, and HP 54645A oscilloscopes. For more information about this option, request data sheet 5965-1100 EN.

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(1) Tested to Hewlett-Packard Environmental Specification Section 758 for Class B-1 products
HP 54650A HP-IB Interface Module

Provides full remote control and hard copy to HP-IB printers and plotters. Programming is in accordance with IEEE 488.2. With the addition of this module, the scope’s two pixel memories become non-volatile. An operating and programming manual and a programming examples disk are supplied.

Specifications

The interface capabilities of the HP 54600 series oscilloscope with this module installed are as defined by IEEE 488.1 as Sh1, Ah1, Ts, L4, Sr1, Rl1, Pp1, DC1, DTL, C0 and E2.

Printer/Plotter Supported

HP ThinkJet, HP QuietJet, HP PaintJet, and HP LaserJet; HP-GL compatible plotters.

HP 54652B RS-232/Parallel Interface Module

Provides full remote control via RS-232 and printing via parallel in one module. The RS-232 can also be configured for printing when not being used for remote control.

Specifications

Connector Type: 9 pin (m) DTE Port, works with HP 34398A RS-232 cable.

Protocols:

Xon/Xoff, hardwire

Data Bits:

8

Parity:

None

Baud Rates:

1200, 2400, 9600, or 19200

Printer/Plotter Support:

HP ThinkJet, HP QuietJet, HP PaintJet, and HP LaserJet; HP-GL compatible plotters.

Specifications

Connector Type: 25 pin (F) connector, works with HP C2950A parallel printer cable.

Supported Printers:

Epson FX-80 or HP PCL compatible printers.

HP 54657A and 54659B Measurement/Storage Modules

With the addition of either the HP 54657A module with HP-IB interface or the HP 54659B module with RS-232 and parallel interface, the HP 54600 series oscilloscope will provide all of the following features.

19 Automatic Measurements consisting of:

Voltage: Vamp, Vavg, Vrms, Vpp, Vpre, Vour, Vtop, Vbase, Vmin, and Vmax

Time: Delay, Duty Cycle, Frequency, Period, Phase Angle, Rise Time, Fall Time, + width, and - width

Thresholds: User selectable among 10%/90%, 20%/80%, or absolute voltage levels.

Cursor Readout Modes

Voltage or percentage

Time or phase angle

Waveform Math Functions

Function 1: Addition, subtraction, and multiplication

Function 2: Differentiation, integration, and FFT

FFT:

Windows: Exponential, flat top, Hanning and rectangular

Samples: 1024 points

Trace Memory

Memories 1 – 3: High speed storage without compression.

Memories 4 – 100: Storage with compression. Storage time is approximately 7 seconds. Number of traces that can be stored is a function of complexity, with the minimum being 4 highly complex traces and the maximum being 96.

Memory Labeling:

An onscreen text editor is provided for creating labels up to 20 characters. Each label contains the date and time it was saved.

Real Time Clock:

24-hour format with battery back-up. Can be set from front panel.

Unattended Waveform Monitoring

Testing Method:

Comparison to waveform mask.

Number of M asks:

2

Mask Generation and Operation:

Automask, controlled from the front panel, generates mask from displayed waveform with selectable tolerance. M ask editor function allows pixel-by-pixel editing and line drawing. Smoothing function performs a running average of 3 pixels.

Action on Failure:

• Save failed trace to memory with date and time of the failure

• Print failed trace with date and time of the failure

• Count the failure and maintain pass/fail statistics while continuing the test

Hard Copy and Programmability Interface

HP 54657A HP-IB (For HP-IB specifications see HP 54650A)

HP 54658A RS-232 (For RS-232 specifications see HP 54652B)
Probe Accessories

**HP 10072A**
*SMT Probe tips for HP 1007X probes*
This accessory adapts this series of rugged probes to HP logic analyzer style grabbers that can be used in SMT probing applications. Supplied with 8 grabbers.

**HP 5081-7705**
*BNC Adapter for HP 1007X probes*
This accessory clips on the end of the probe and allows the probe to mate with BNC (f) connectors.

**HP 5081-7690**
*Replacement Accessory Kit for HP 1007X probes*
This kit contains replacement Hook Tip, IC Tip, Ground Bayonet, Ground Lead, Adjustment Tool, and Probe Identification Tags.

Specifications for HP 54600-Series Scope Probes

<table>
<thead>
<tr>
<th>Probe Model Number</th>
<th>Bandwidth</th>
<th>Division Ratio</th>
<th>Approx. Length</th>
<th>Input Impedance</th>
<th>Approx. Capacitance</th>
<th>Rise-time</th>
<th>Max. Input</th>
<th>Scope Compatibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>10070A</td>
<td>20 MHz</td>
<td>1:1</td>
<td>1.5m</td>
<td>1 MΩ</td>
<td>70 pF</td>
<td>&lt;17.5 ns</td>
<td>400 V</td>
<td>HP 54600-series</td>
</tr>
<tr>
<td>10071A</td>
<td>150 MHz</td>
<td>10:1</td>
<td>1.5m</td>
<td>10 MΩ</td>
<td>15 pF</td>
<td>&lt;2.33 ns</td>
<td>450 V</td>
<td>HP 54600/02/03/45B</td>
</tr>
<tr>
<td>10073A</td>
<td>500 MHz</td>
<td>10:1</td>
<td>1.5m</td>
<td>1 MΩ</td>
<td>12 pF</td>
<td>&lt;0.7 ns</td>
<td>450 V</td>
<td>HP 54610/15/16B</td>
</tr>
<tr>
<td>10074A</td>
<td>150 MHz</td>
<td>10:1</td>
<td>1.5m</td>
<td>10 MΩ</td>
<td>12 pF</td>
<td>&lt;2.33 ns</td>
<td>450 V</td>
<td>HP 54645A</td>
</tr>
<tr>
<td>10442A</td>
<td>1 GHz</td>
<td>10:1</td>
<td>2.0m</td>
<td>500 MΩ</td>
<td>1.2 pF</td>
<td>&lt;0.35 ns</td>
<td>10 V</td>
<td>scopes with 50 Ω inputs</td>
</tr>
<tr>
<td>10444A</td>
<td>500 MHz</td>
<td>10:1</td>
<td>1.6m</td>
<td>1 MΩ</td>
<td>6-15 pF</td>
<td>&lt;0.7 ns</td>
<td>450 V</td>
<td>HP 54610/15/16B</td>
</tr>
<tr>
<td>1137A</td>
<td>1 MHz</td>
<td>1000:1</td>
<td>1.5m</td>
<td>500 MΩ</td>
<td>3 pF</td>
<td>&lt;35 ns</td>
<td>5 KV</td>
<td>scopes with 1 MΩ inputs</td>
</tr>
</tbody>
</table>

Additional Measurement Accessories

**HP 10100C**
*50 Ω ± 1% Feedthrough Termination BNC (f) to BNC (m)*
Frequency range 0 Hz to 300 MHz, Max. VSWR 1.1:1

**HP 11094B**
*75 Ω ± 0.2% Feedthrough Termination BNC (f) to BNC (m)*
Maximum power 1 W, maximum current 1 A

**HP 1251-2277**
*Dual Banana(m) to BNC (f)*
Adapter

**HP 10110B**
*Dual Banana(m) to BNC (m)*
Adapter

**HP 10098A**
*Front Panel Cover and Pouch Kit*
This kit will add the Option 101 front panel cover and pouch to any 54600-series oscilloscope.

**HP 1183A**
*Testmobil Scope Cart for HP 54600-series scopes*
Ordering Information

HP 54600-Series Oscilloscopes
HP 54600B Two-channel, 100 MHz Oscilloscope
HP 54602B Four-channel, 150 MHz Oscilloscope
HP 54603B Two-channel, 60 MHz Oscilloscope
Each of the above oscilloscopes comes with two 1.5 meter 10X probes (HP 10071A), a user's and service guide, and power cord.
HP 54610B Two-channel, 500 MHz, 20 MSa/s Oscilloscope
HP 54615B Two-channel, 500 MHz, 1 GSa/s Oscilloscope
HP 54616B Two-channel, 500 MHz, 2 GSa/s Oscilloscope
HP 54616C Color two-channel, 500 MHz, 2 GSa/s Oscilloscope
HP 54645A Two-channel, 100 MHz, 200 MSa/s Oscilloscope
Each of the above oscilloscopes comes with two 1.5 meter 10X probes (HP 10073A), a user's and service guide, and power cord.

Options
Opt. 001 RS-03 Magnetic interface shielding added to CR
Opt. 002 RE-02 Display shield added to CRT to reduce radiated emission
Opt. 005 Enhanced TV/video triggering (not HP 54600B/03B)
Opt. 090 Delete probes (for HP 54600B/02/03B)
Opt. 100 Delete probes (for HP 54010B, 5415B, 5416B/C)
Opt. 101 Accessory pouch and front panel cover (HP 10098A)
Opt. 102 Two additional HP 10071A probes (HP 54602B only)
Opt. 103 Operator training kit (includes training signal board & lab workbook)
Opt. 104 Carrying case (protects scope for shipping or baggage checking)
Opt. 106 HP BenchLink Scope software for Windows (HP 34810B)
Opt. 1CM Rack Mount Kit (P/N 5062-7345)
Opt. W 50 Additional 2-year warranty (5-year total), starting at

Manual options (please specify one)
ABA US English ABF French ABJ Japanese
ABD German ABZ Italian AB1 Korean
ABE Spanish ABO Taiwan Chinese

HP 54650-series enhancement modules
HP 54650A HP-IB interface module
HP 54652A Parallel interface module
HP 54652B RS-232 and parallel interface module
HP 54655A HP-IB test automation module (compatible only with HP 54600B/03B)
HP 54656A RS-232 test automation module (compatible only with HP 54600B/03B)
HP 54657A HP-IB measurement/storage module
HP 54659B RS-232 and parallel measurement/storage module
Each module includes user's and programmer's guides; HP 54656A includes HP 95651-6104 RS-232 adapter cable and one 2-meter RJ45 cable.

Additional oscilloscope accessories, probes and terminations
HP 10070A 1:1 probe
HP 10071A 10:1 probe
HP 10072A 50 MHz precision probes
HP 10073A 1:1 500 MHz probe with readout
HP 10074A 1:1 150 MHz probe with readout
HP 10442A 1:1 GHz probe for 50 Ω inputs.
HP 10444A 1:1 500 MHz mini-probe with readout
HP 1137A 1000:1 high-voltage probe
HP 10100C 50 Ω feedthrough termination
HP 5081-7690 HP 1007X probe accessory kit
HP 5081-7705 HP 1007X probe-to-BNC (m) adapter
HP 10098A Front panel cover and pouch kit
HP 34327A Inverter, 12 Volt dc to 115 V ac
HP 34810B BenchLink Scope Software
Includes software on 3.5" disk, user’s guide, (all languages) HP-IB or RS-232 module needed for connection to scope.