Interface Modules for
HP 54600-Series Instruments
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Introduction

These modules provide the means for remote communication with HP 54600-series instruments. For programming specifics, refer to the Programmer’s Guide or Programmer’s Reference shipped with your oscilloscope or logic analyzer. The hardcopy process does not interrupt front-panel operation of the instrument. While any of the interfaces are connected to the rear panel of the instrument, the instruments trace memories become nonvolatile and are saved when the power is removed from the instrument.

**HP 54650A HP-IB Interface Module**
- Full programmability
- Hardcopy output

**HP 54651A RS-232-C Interface Module**
- Full programmability
- Hardcopy output

**HP 54652A Parallel Interface Module**
- Hardcopy output

**HP 54652B Parallel/RS-232-C Interface Module**
- Full programmability
- Hardcopy output
- Connection to both an RS-232-C controller and a parallel printer at the same time.

**HP 54655A Test Automation Module (HP-IB) and HP 54656A Test Automation Module (RS-232-C)**
- Full programmability.
- Hardcopy output.
- 100 nonvolatile sequence steps.
- 40 nonvolatile mask templates.
• 2 nonvolatile trace memories.
• Built-in automatic mask generation and mask editing capabilities.
• Protection of test sequence and mask template setup through software.

The HP 54656A has the following additional features:
• External input lines for Next, Previous and Reset control.
• 5 user-definable output lines.
• Recessed protection switch.

• Full programmability.
• Hardcopy output.
• Three additional automatic voltage measurements (amplitude, preshoot, and overshoot).
• Two additional automatic time measurements (delay and phase angle).
• User defined measurement thresholds of 10%/90%, 20%/80%, or selected voltage values.
• Two additional cursor measurements (voltage in percent and time in degrees).
• Two additional cursor measurement sources (math function 1 and 2).
• Waveform math functions (addition, subtraction, multiplication, differentiation, integration, and FFT).
• Time and date tagging of hardcopy and nonvolatile memories.
• Three nonvolatile trace memories.
• Additional 64K of nonvolatile trace memory (with data compression).

The HP 54659B has an additional parallel output connector which allows the module to be connected to both an RS-232-C controller and a parallel printer at the same time.
## Interface I/O functions

<table>
<thead>
<tr>
<th>Interface module</th>
<th>Interface connection</th>
<th>I/O Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP 54650A</td>
<td>HP-IB</td>
<td>HP-IB controller or HP-IB output to printer/plotter</td>
</tr>
<tr>
<td>HP 54651A</td>
<td>RS-232-C</td>
<td>RS-232-C controller or RS-232-C output to printer/plotter</td>
</tr>
<tr>
<td>HP 54652A</td>
<td>Parallel</td>
<td>Parallel output to printer</td>
</tr>
<tr>
<td>HP 54652B²</td>
<td>RS-232-C and parallel</td>
<td>RS-232-C controller and parallel output to printer, or RS-232-C output to printer/plotter</td>
</tr>
<tr>
<td>HP 54655A¹•³</td>
<td>HP-IB</td>
<td>HP-IB controller or HP-IB output to printer/plotter</td>
</tr>
<tr>
<td>HP 54656A¹•³</td>
<td>RS-232-C</td>
<td>RS-232-C controller or RS-232-C output to printer/plotter</td>
</tr>
<tr>
<td>HP 54657A¹</td>
<td>HP-IB</td>
<td>HP-IB controller or HP-IB output to printer/plotter</td>
</tr>
<tr>
<td>HP 54658A¹</td>
<td>RS-232-C</td>
<td>RS-232-C controller or RS-232-C output to printer/plotter</td>
</tr>
<tr>
<td>HP 54659B¹•²</td>
<td>RS-232-C and parallel</td>
<td>RS-232-C controller and parallel output to printer, or RS-232-C output to printer/plotter</td>
</tr>
</tbody>
</table>

¹ The enhanced features of the HP 54655A/56A/57A/58A/59B are not available to the HP 54620A/C Logic Analyzer. These modules supply enhanced oscilloscope programming functions. The I/O functions of these modules will function when used with the HP 54620A/C Logic Analyzer.

² The 54652B and HP 54659B are not compatible with the HP 54600A, HP 54601A, HP 54602A, and HP 54610A.

³ The 54655A and HP 54656A are not compatible with the HP 54615B, HP 54615B, HP 54645A and HP 54645D.
To install the interface module

1 Turn off the instrument.
2 Install the module as shown below.
   The instrument is reset after installation. The installed interface module is shown in the message displayed when your turn on the instrument. The I/O functions (controller and hardcopy) are available by pressing the instrument front-panel **Print/Utility** key.
### Interface Cables

<table>
<thead>
<tr>
<th>Interface module</th>
<th>Cable function (Instrument to ..)</th>
<th>Module connector</th>
<th>Printer/plotter/ controller connector</th>
<th>HP part number</th>
<th>Cable Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP 54650A, HP 54655A&lt;sup&gt;1,3&lt;/sup&gt;, HP 54657A&lt;sup&gt;1&lt;/sup&gt; (HP-IB)</td>
<td>Printer/plotter/ controller</td>
<td>HP-IB</td>
<td>HP-IB</td>
<td>HP 10833A</td>
<td>1 m (3.3 ft)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HP 10833B</td>
<td>2 m (6.6 ft)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HP 10833C</td>
<td>4 m (13.2 ft)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HP 10833D</td>
<td>0.5 m (1.6 ft)</td>
</tr>
<tr>
<td>HP 54651A, HP 54656A&lt;sup&gt;1,3&lt;/sup&gt;, HP 54658A&lt;sup&gt;1&lt;/sup&gt; (RS-232-C)</td>
<td>Printer/plotter/ controller</td>
<td>25-pin F</td>
<td>25-pin F</td>
<td>HP 13242G</td>
<td>5 m (16.7 ft)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HP 17255M</td>
<td>1.5 m (4.9 ft)</td>
</tr>
<tr>
<td>Controller</td>
<td>25-pin F</td>
<td>25-pin M</td>
<td>HP 92219J</td>
<td>5 m (16.7 ft)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HP 17255D</td>
<td>1.5 m (4.9 ft)</td>
</tr>
<tr>
<td>Controller</td>
<td>25-pin F</td>
<td>9-pin M</td>
<td>HP 24542G</td>
<td>3 m (9.9 ft)</td>
<td></td>
</tr>
<tr>
<td>HP 54652A (parallel output only)</td>
<td>Parallel printer</td>
<td>parallel</td>
<td>parallel</td>
<td>C2950A</td>
<td>2 m (6.6 ft)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C2951A</td>
<td>3 m (9.9 ft)</td>
</tr>
<tr>
<td>HP 54652B&lt;sup&gt;2&lt;/sup&gt;, HP 54659B&lt;sup&gt;1,2&lt;/sup&gt; (RS-232-C and parallel output)</td>
<td>RS-232-C controller</td>
<td>9-pin M</td>
<td>25-pin M</td>
<td>HP 34398A</td>
<td>2.5 m (8.2 ft)</td>
</tr>
<tr>
<td></td>
<td>RS-232-C controller</td>
<td>9-pin M</td>
<td>9-pin M</td>
<td>HP 34398A</td>
<td>2.5 m (8.2 ft)</td>
</tr>
<tr>
<td></td>
<td>RS-232-C controller</td>
<td>9-pin M</td>
<td>25-pin F</td>
<td>HP 34398A + HP 34399A adapter kit</td>
<td>2.5 m (8.2 ft)</td>
</tr>
<tr>
<td>Parallel printer</td>
<td>parallel</td>
<td>parallel</td>
<td>C2950A</td>
<td>2 m (6.6 ft)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>C2951A</td>
<td>3 m (9.9 ft)</td>
<td></td>
</tr>
</tbody>
</table>

1. The enhanced features of the HP 54655A/56A/57A/58A/59B are not available to the HP 54620A/C Logic Analyzer. These modules supply enhanced oscilloscope programming functions. The I/O functions of these modules will function when used with the HP 54620A/C Logic Analyzer.

2. The 54652B and HP 54659B are not compatible with the HP 54600A, HP 54601A, HP 54602A, and HP 54610A.

3. The 54655A and HP 54656A are not compatible with the HP 54615B, HP 54615B, HP 54645A, and HP 54645D.
The Print/Utility menu of your HP 54600-series instrument allows you to select I/O functions for the module you have connected to your instrument. The module can have an HP-IB, RS-232-C, parallel, or combination RS-232-C/parallel interface.

- To display this menu, press \textbf{Print/Utility}.

\begin{itemize}
  \item \textbf{Print Screen} pressing this softkey sends the screen image to your printer or plotter.
  \item Interface setup
    \begin{quote}
      In many cases, the interface will need to be configured before attempting to print. If you are setting up an HP-IB module, refer to "To set HP-IB addresses" on page 17. If you are setting up an RS-232-C module, refer to "To set RS-232 baud rate and handshake" on page 18.
    \end{quote}
  \item \textbf{Hardcopy Menu} this softkey allows you to select your printer or plotter type and to set parameters for that printer or plotter.
  \item \textbf{I/O Menu} this softkey allows you to set up parameters for your RS-232-C or HP-IB interface for printer or controller operation.
  \item \textbf{Service Menu} and \textbf{System Config} these softkeys control instrument and enhanced module functions such as service self-test, service self-calibration and system configuration. Refer to your instrument \textit{User and Service Guide} or enhanced module \textit{User's Guide} for use of these softkeys.
\end{itemize}
To select your printer or plotter.

- Press the **Hardcopy Menu** softkey to view printer/plotter options.
  Your module can be configured to print in several formats.
- To select the format of your printer/plotter, press the **Format** softkey until the desired format is displayed.

**Format** Your module can be configured to print in the following formats:

- **LaserJet** HP LaserJet format
- **DJ mono** monochrome HP DeskJet format
- **DJ color** color HP DeskJet format (color HP 54600-series instruments only)
- **Epson** Epson format
- **ThinkJet** HP ThinkJet format (HP-IB and RS-232-C modules only)
- **Plotter** HP plotter (HP-GL) format. This format is available on HP-IB and RS-232-C modules only and is not an option on color HP 54600 instruments.
**Destination** If you have an RS-232-C/parallel dual interface module, press the Destination softkey to select the hardcopy output destination of the module to be **RS-232** or **Parallel**.

**Printer address** If you have an HP-IB interface module, press the PrintAddr softkey until the correct address is displayed. The address can also be incremented or decremented by turning the knob closest to the Cursors key. The default printer/plotter address is 1.
To setup your printer or plotter

- From the **Hardcopy Menu**, press the **Printer Setup** softkey.

**Selecting Printer Setup from the Hardcopy Menu**

Printer/plotter options are displayed for formfeed, scale factors, and gray scale printing.

**Printer setup options for HP LaserJet and HP DeskJet formats**
To set formfeed

- To set formfeed, press the Hardcopy Menu softkey, then the Printer Setup softkey. Formfeed can be selected as On or Off. The instrument will send a formfeed command after printing when Formfeed is set to On.

<table>
<thead>
<tr>
<th>Formfeed is not an option when Format is set to Plotter.</th>
</tr>
</thead>
</table>
To print or plot gray scale

Gray scale printing

• To print in gray scale, press the Hardcopy Menu softkey, then the Printer Setup softkey. GrayScale can be selected as On or Off.

Selecting GrayScale from the Printer Setup menu

When gray scale printing is selected, the full-bright and half-bright traces on the instrument screen are printed on the hardcopy.

Gray scale printing requires an HP-PCL printer capable of at least 300 dpi (dots-per-inch), such as an HP LaserJet or HP DeskJet series printer. Grayscale printing is not available with ThinkJet and Epson formats. If you have a color HP 54600-series instrument, DJ Color format will print in 2 different colors.
Gray scale plotting

1. Press the **Hardcopy Menu** softkey, then press the **Format** softkey until **Plotter** is displayed.

2. Press the **Plotter Setup** softkey, then press the **Colors** softkey until **2** is displayed.

Gray scale plot uses two pens for the hardcopy. Half-bright traces are plotted with plotter pen 1 and full-bright traces are plotted with plotter pen 2.
To print or plot scale factors

Instrument scale factors may be turned on or off for hardcopy prints and plots. All factors are printed on the hardcopy when on is selected. When factors is selected for a hardcopy plot, the plot is in portrait mode. When factors is not selected for hardcopy plot, the plot is in landscape mode.

1. Press the **Hardcopy Menu** softkey, then press the **Printer Setup** softkey.
2. Press the **Factors** softkey until **On** is displayed.

---

**Print or Plot with Factors On (portrait mode)**

<table>
<thead>
<tr>
<th>State</th>
<th>Volts/Div</th>
<th>Position</th>
<th>Couplg</th>
<th>BW Lim</th>
<th>Invert</th>
<th>Probe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chan 1</td>
<td>On</td>
<td>1.000 V</td>
<td>-2.366 V</td>
<td>DC</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Chan 2</td>
<td>Off</td>
<td>100.0mV</td>
<td>0.000 V</td>
<td>DC</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Chan 3</td>
<td>Off</td>
<td>100.0mV</td>
<td>0.000 V</td>
<td>DC</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Chan 4</td>
<td>Off</td>
<td>100.0mV</td>
<td>0.000 V</td>
<td>DC</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

---

**I/O Function Guide**

To print or plot scale factors
Plot with Factors Off (landscape mode)
To set HP-IB addresses

• To set addresses on HP-IB modules, press **Print/Utility**, then press the **I/O Menu** softkey.

Setting HP-IB addresses

This menu allows you to set the instrument and printer/plotter address. Each device on an HP-IB bus must have a unique instrument address between 0 and 30.

**Instrument address**

To set the instrument address, press the **InstAddr** softkey until the correct address is displayed. The address can also be incremented or decremented by turning the knob closest to the **Cursors** key. The default instrument address is 7.

**Printer Address**

To set the printer or plotter address on the HP-IB bus, press the **PrintAddr** softkey until the correct address is displayed. The address can also be incremented or decremented by turning the knob closest to the **Cursors** key. The default printer/plotter address is 1.

**See also**

For more information on HP-IB parameters, refer to the Programmer’s Guide that came with your HP 54600-Series instrument.
To set RS-232 baud rate and handshake

- To set the baud rate and handshake parameters on a module with an RS-232 interface, press [Print/Utility], then press the I/O Menu softkey.

### Setting RS-232 baud rate and handshake

#### Baud rate

To set the RS-232 baud rate, press the Baud Rate softkey until the correct value is displayed. The baud rate can also be incremented or decremented by turning the knob closest to the Cursors key. The baud rate can be selected as 1200, 2400, 9600, or 19200. The default baud rate is 9600.

#### Handshake

To set the RS-232 handshake protocol, press the Handshake softkey until the correct protocol is displayed. 
Handshake can be set to DTR (data terminal ready) or XON (XON-transmit on /XOFF-transmit off.)

See also

For more information on RS-232 parameters, refer to the Programmer’s Guide that came with your HP 54600-Series instrument.
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