About this Manual

We’ve added this manual to the Agilent website in an effort to help you support your product. This manual is the best copy we could find; it may be incomplete or contain dated information. If we find a more recent copy in the future, we will add it to the Agilent website.

Support for Your Product

Agilent no longer sells or supports this product. Our service centers may be able to perform calibration if no repair parts are needed, but no other support from Agilent is available. You will find any other available product information on the Agilent Test & Measurement website, www.tm.agilent.com.

HP References in this Manual

This manual may contain references to HP or Hewlett-Packard. Please note that Hewlett-Packard's former test and measurement, semiconductor products and chemical analysis businesses are now part of Agilent Technologies. We have made no changes to this manual copy. In other documentation, to reduce potential confusion, the only change to product numbers and names has been in the company name prefix: where a product number/name was HP XXXX the current name/number is now Agilent XXXX. For example, model number HP8648A is now model number Agilent 8648A.
HP BenchLink XL 54600
Software for the HP 54600-Series Oscilloscopes

Getting Started With
HP BenchLink XL
Warranty

A copy of the specific warranty terms applicable to your Hewlett-Packard product can be obtained from your local HP Sales and Service Office.

Exclusive Remedies

The remedies provided herein are the Buyer's sole and exclusive remedies. HP shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory.

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Palo Alto, California  94304  U.S.A.

Printing History

New editions are complete revisions of the manual. Update packages, which are issued between editions, may contain additional information and replacement pages which you merge into the manual. The dates on this page change only when a new edition is published.

Edition 1 (Part Number 54600-97030) July 1999
Printed in U.S.A.
Software Overview

HP BenchLink XL offers a set of connectivity tools that enable you to quickly and easily move data from your HP 54600-Series Oscilloscopes to your PC. Whether you are an experienced programmer or would prefer not to program at all, HP BenchLink XL is designed to give you a high-level of instrument control using software applications that you are probably already using on your PC.

For the Non-Programmer — A Simple Toolbar Add-In for Excel and Word

HP BenchLink XL provides an easy-to-use toolbar that enables you to perform simple waveform data and image transfers directly into Microsoft® Excel® or Microsoft® Word®. Once installed, the toolbar is automatically loaded and operates just like any other toolbar in these applications. Use the Tools | Add-Ins menu to add or remove the toolbar from the application. The toolbar is shown below with a brief description of each toolbar button.

NOTE: To get started with the toolbar, you will need to open Excel or Word. The toolbar will automatically load when you open the application.

About HP 54600 Scope Toolbar  Returns the software version number and allows you to select the local language for the dialog boxes and help system.

Connect to Scope  Configures the remote interface connection to the oscilloscope.

Save / Load Scope Settings  Stores the oscilloscope settings to a file or downloads a previously-stored settings file to the oscilloscope.

Get Waveform Data  Uploads waveform time/voltage data from the oscilloscope to the active worksheet or document.

Get Screen Image  Captures an image of the oscilloscope’s display and places it in the active worksheet or document.

Get Single Measurement  Acquires a single measurement (rise time, duty cycle, frequency, etc.) from the oscilloscope and places it in the active worksheet or document.

Toolbar Help  Provides step-by-step explanations to help you learn to use the toolbar.
Excel Macro Support

You can create a macro for any of the toolbar operations using the Excel macro recording feature. You can then run the macro to automatically "play back" the recorded actions.

For the Programmer — An ActiveX Custom Control

For more sophisticated programming, an ActiveX™ Custom Control is provided with HP BenchLink XL to make it easy to program your oscilloscope using common programming environments such as Visual Basic®, Visual Basic® for Applications (Excel and Word), and Visual C++®. The HP54600Scope Control gives you all of the functionality of the toolbar plus the added capability to programmatically control the operation of the oscilloscope. Within the Microsoft environment, you have complete access to all of the property pages, context-sensitive help, and persistence.

As shown in the sample below, it only takes a few lines of Visual Basic code to capture the waveform data and obtain a screen image from the oscilloscope using the HP54600Scope Control.

```vbnet
With Scope
 .AnalogChannels(1).Enabled = True
 .GetWaveformData Channel_1, 200, xdata, ydata
 Image1.Picture = .GetScreenImage
End With
```

The first line of code enables Channel 1 on the oscilloscope. The second line of code captures the waveform time/voltage pairs (200 waveform points) from Channel 1 and stores the data in two arrays. The third line of code shows the use of Microsoft's "IntelliSense" feature to select the function that places the screen image into an Image control.

To help you become familiar with the structure and operation of the HP54600Scope Control, we have included several programming examples with HP BenchLink XL. These files will be loaded on your PC as part of the installation procedure. For more information, navigate to:

Start | Programs | HP BenchLink XL | HP54600 | Samples

We have also included several getting started documents to help you become familiar with the HP54600Scope Control in Excel, Visual Basic, and C++. For more information, navigate to:

Start | Programs | HP BenchLink XL | HP54600 | Automation Server Help
Toolbar Overview

About HP 54600 Scope Toolbar

The dialog boxes and help system are available in several languages. Use the following dialog box to select the desired language.

Connect to Scope

HP BenchLink XL makes it easy to establish an interface connection between your oscilloscope and your PC. Whether you are connecting to the oscilloscope using an HP-IB (GPIB) port or an RS-232 (COM) port, HP BenchLink XL does the work for you. Simply press the Search button (see below) and HP BenchLink XL determines which instruments are connected to your PC.
Save / Load Scope Settings

HP BenchLink XL gives you the ability to store the current oscilloscope settings to a file on your PC or download previously-stored settings to your oscilloscope. The oscilloscope settings are stored in a binary format (.scp file extension).

Get Waveform Data

One of the most powerful features of HP BenchLink XL is the ability to capture waveform data (time/voltage pairs) from the oscilloscope. From Excel, the waveform data is automatically placed in rows and columns on the spreadsheet and you can also generate a graph using the captured data. From Word, the waveform data is downloaded, a graph is generated, and both are placed in the active document.

Excel Dialog Box:
A sample from Excel is shown below. When the waveform data is uploaded from the oscilloscope, the points are automatically plotted using Excel's built-in charting function.

Word Dialog Box:

Get Waveform Data

Number of Data Points:

500

To place a waveform graph at the cursor in the current document, select the number of points and click 'OK'.
Get Screen Image

For documentation purposes, you may want to capture a "snapshot" of the oscilloscope display. With HP BenchLink XL, it just takes a few seconds to insert the image into your Excel or Word document. Note that you can also save the image to a file (.bmp format).

A sample screen image is shown below.
Get Single Measurement

For some applications, you may want to capture a single measurement (rise time, duty cycle, frequency, etc.) and place it in the active worksheet or document. From the Function drop-down list (see below), you can select a specific measurement or select "All Functions" to place all 12 available measurements in the active document.

Excel Dialog Box:

A sample from Excel is shown below. In Excel, the measurement is placed in the highlighted cell. If desired, you can annotate each reading (mV, kHz, etc.). The sample below shows all 12 available measurements placed in the active worksheet.

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<th>B</th>
<th>C</th>
<th>D</th>
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<tr>
<td>1</td>
<td>874.782 mV, Volts Average</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>57.668 mV, Volts RMS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>198.438 mV, Volts Peak-to-Peak</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>101.563 mV, Volts Max</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>-98.438 mV, Volts Min</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>570 us, Rise Time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>570 us, Fall Time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>710 us, Pos Pulse Width</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>705 us, Neg Pulse Width</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>1.425 ms, Period</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>699.301 Hz, Frequency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>49.823 %, Duty Cycle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>14</td>
<td></td>
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</tr>
</tbody>
</table>
Word Dialog Box:

A sample from Word is shown below. In Word, the measurement is placed at the cursor in the active document. If desired, you can annotate each reading (mV, kHz, etc.). The sample below shows all 12 available measurements placed in the active document.

Volts Average = 18.42 mV  
Volts RMS = 97.14 mV  
Volts Peak-to-Peak = 200.00 mV  
Volts Max = 93.75 mV  
Volts Min = -106.25 mV  
Rise Time = 1.60 us  
Fall Time = 1.60 us  
Pos Pulse Width = 520.00 us  
Neg Pulse Width = 300.00 us  
Period = 1.00 ms  
Frequency = 1.00 kHz  
Duty Cycle = 52.00 %

Toolbar Help

Like most PC applications, a help system is included with HP BenchLink XL to assist you with the operation of the toolbar. The help system and all dialog boxes are available in multiple languages.
Software Installation

Installing HP BenchLink XL

You can install HP BenchLink XL from the CD-ROM included with your oscilloscope's interface module or you can download the software from the Hewlett-Packard web site (www.hp.com/go/bi). Software updates and future releases will also be available from this web site.

After installing the software on your PC, go to the Tools | Add-Ins menu in Excel or Word to enable HP BenchLink XL operations in the selected application. For more information on using the HP54600Scope Control with Visual Basic, refer to the help file included with the ActiveX Control. Note that all of the necessary I/O functionality is also loaded when you install the software, including the ability to control your oscilloscope using both Hewlett-Packard and National Instruments interface cards and standard RS-232 (COM) ports on your PC.

Minimum System Requirements

PC Operating System Requirements:

**Windows® 95 or Windows® 98**
- 486DX/66
- 16 MB RAM
- 20 MB free disk space

**Windows NT® 4.0**
- Service Pack 3
- Pentium-90
- 32 MB RAM
- 20 MB free disk space

Environments Supported:

**Applications**
- Microsoft Excel 97
- Microsoft Word 97

**Software Development**
- Visual Basic 5.0/6.0
- VBA 5.0
- HP VEE 5.0 or greater
- LabVIEW 5.0 or greater
- Visual C/C++ 5.0/6.0
Supported Instruments

Oscilloscope Models Supported:
- HP 54600B
- HP 54602B
- HP 54603B
- HP 54610B
- HP 54615B
- HP 54616B/C
- HP 54620A/C
- HP 54645A/D

Interface Modules Supported:
- HP 54650A
- HP 54652B
- HP 54657A
- HP 54659B

Supported PC-to-Instrument Interfaces

HP-IB (GPIB) Interface

Supported using HP SICL (Standard Instrument Control Library):
- HP 82335B
- HP 82340A/B/C
- HP 82341A/B/C/D
- HP 82350A

Supported using National Instruments NI-488.2 Library:
- National Instruments AT-GPIB/TNT
- National Instruments PCI-GPIB
- National Instruments PCMCIA-GPIB

RS-232 Interface:
- COM1
- COM2
- COM3
- COM4
Task Reference: HP 54600 Scope Toolbar for Excel

HP BenchLink XL provides an easy-to-use toolbar that enables you to perform simple waveform data and image transfers directly into Excel. Once installed, the toolbar is automatically loaded and operates just like any other toolbar in these applications. Use the Tools | Add-Ins menu to add or remove the toolbar from the application.

Connect to the Scope and Verify Communication

1. Click Connect to Scope on the HP Scope toolbar.
2. From the Search Instruments tab, click Search to find all instruments connected to your PC. If this is your first ‘Search’, all interface ports on your PC will be checked. To exclude any ports or instruments from future searches, click the Search Criteria tab.
3. Select the desired HP 54600-Series Oscilloscope from the list.
4. Click Test to verify the interface connection.
5. Click OK to save the connection.

Note: If the dialog box shows an HP 54600-Series Oscilloscope selected, then the connection has already been established.

Get Waveform Time / Voltage Data from the Scope

1. Click Get Waveform Data on the HP Scope toolbar.
2. Select New sheet to place the waveform data in a new Excel worksheet or Selected sheet to use the active worksheet.
3. From the Number of Data Points drop-down list, select the number of points to be downloaded from the Scope.
4. Click OK.
**Make a Graph of the Waveform Points Obtained from the Scope**

1. Click Get Waveform Data on the HP Scope toolbar.
2. To create an Excel graph of the waveform data obtained from the Scope, check Make Excel graph.
3. Select New sheet to place the graph in a new Excel worksheet or Sheet with data to use the active worksheet.
4. Click OK.

**Insert an Image of the Scope Display in the Spreadsheet**

1. Click Get Screen Image on the HP Scope toolbar.
2. Select Place in active sheet to place the image in the active worksheet. Note that you can also save the image to a file (.bmp format).
3. Click OK.

**Capture a Single Measurement from the Scope**

1. Click Get Single Measurement on the HP Scope toolbar.
2. From the Scope Channel drop-down list, select an enabled (‘On’) scope channel.
3. From the Function drop-down list, select the desired measurement (or ‘All Functions’).
4. Select the cell in which you want to place the measurement. If desired, select with Engineering Units to annotate each reading (mV, kHz, etc.).
5. Click OK.

**Save the Current Scope Settings to a File**

1. Click Save / Load Scope Settings on the HP Scope toolbar.
2. Select Save Scope Settings to File and then click OK.
3. Navigate to the desired directory on your PC and enter a file name (.scp file extension).
4. Click Save to store the file.
Download Previously-Stored Settings to the Scope

1. Click **Save / Load Scope Settings** on the HP Scope toolbar.
2. Select **Load Scope Settings From File** and then click **OK**.
3. Navigate to the desired directory on your PC and open the previously stored file (.scp file extension).
   Note that you can also download a file stored from HP BenchLink Scope (.stp file extension).
4. Click **Open** to open the file and download the stored settings to the Scope.

**Note:** An error may be generated if you attempt to download to a different Scope than was used to create the original settings file.

Delete the HP 54600 Scope Toolbar from Excel

1. From the **Tools** menu in Excel, select **Add-Ins**.
2. Clear the check box next to 'HP 54600 Scope Toolbar'. Make sure that the box is not checked.
3. Click **OK**.

Automate Tasks Using an Excel Macro

You can automate any of the operations on the HP Scope Toolbar using an Excel macro. You can then run the macro to automatically "play back" the recorded actions. Refer to the Excel help system for more information on using macros.

The recorded macro automatically lists the required arguments. You may want to record the macro in several different ways to see how the arguments are actually used. All descriptive arguments use English (non-translated) text inside the quotation marks. Numeric arguments, such as a channel number, must be enclosed in quotation marks ("1") as demonstrated in the recorded macro.

For the **HP54600_Measurement** macro, use one of the following strings in the **measureFunction** argument:


Select the Local Language

1. Click **About HP 54600 Scope Toolbar** on the toolbar.
2. Click the **Select Language** tab.
3. Select the desired language. The dialog boxes and help system will appear in the selected language.
4. Click **OK**.
Task Reference: HP 54600 Scope Toolbar for Word

HP BenchLink XL provides an easy-to-use toolbar that enables you to perform simple waveform data and image transfers directly into Word. Once installed, the toolbar is automatically loaded and operates just like any other toolbar in these applications. Use the Tools | Add-Ins menu to add or remove the toolbar from the application.

Connect to the Scope and Verify Communication

1. Click Connect to Scope on the HP Scope toolbar.
2. From the Search Instruments tab, click Search to find all instruments connected to your PC. If this is your first ‘Search’, all interface ports on your PC will be checked. To exclude any ports or instruments from future searches, click the Search Criteria tab.
3. Select the desired HP 54600-Series Oscilloscope from the list.
4. Click Test to verify the interface connection.
5. Click OK to save the connection.

Note: If the dialog box shows an HP 54600-Series Oscilloscope selected, then the connection has already been established.

Get Waveform Data from the Scope and Make a Graph

1. Click Get Waveform Data on the HP Scope toolbar.
2. From the Number of Data Points drop-down list, select the number of points to be downloaded from the Scope.
3. Click OK.
Insert an Image of the Scope Display in the Document

1. Click **Get Screen Image** on the HP Scope toolbar.
2. Select **Place in document at cursor** to place the image in the active document. Note that you can also save the image to a file (.bmp format).
3. Click **OK**.

Capture a Single Measurement from the Scope

1. Click **Get Single Measurement** on the HP Scope toolbar.
2. From the **Scope Channel** drop-down list, select an enabled ('On') scope channel.
3. From the **Function** drop-down list, select the desired measurement (or 'All Functions').
4. Note that you can display the measurement with a variety of annotations (units, decimal places, etc.).
5. Click **OK** to place the measurement at the cursor in the active document.

Save the Current Scope Settings to a File

1. Click **Save / Load Scope Settings** on the HP Scope toolbar.
2. Select **Save Scope Settings to File** and then click **OK**.
3. Navigate to the desired directory on your PC and enter a file name (.scp file extension).
4. Click **Save** to store the file.

Download Previously-Stored Settings to the Scope

1. Click **Save / Load Scope Settings** on the HP Scope toolbar.
2. Select **Load Scope Settings From File** and then click **OK**.
3. Navigate to the desired directory on your PC and open the previously stored file (.scp file extension). Note that you can also download a file stored from HP BenchLink Scope (.stp file extension).
4. Click **Open** to open the file and download the stored settings to the Scope.

**Note:** An error may be generated if you attempt to download to a different Scope than was used to create the original settings file.
Delete the HP 54600 Scope Toolbar from Word

1. From the Tools menu in Word, select Templates and Add-Ins.
2. Clear the check box next to 'hp54600.dot'. Make sure that the box is not checked.
3. Click OK to delete the toolbar from the current session of Word.

Note: When you first install the software, the HP 54600 Scope Toolbar is automatically loaded each time you start Word. An opening dialog box is displayed which allows you to disable automatic loading of the toolbar.

Select the Toolbar Startup Options in Word

When you first install the software, the HP 54600 Scope Toolbar is automatically loaded each time you start Word. An opening dialog box is displayed which allows you to disable automatic loading of the toolbar. If you have disabled automatic loading of the toolbar and now want to re-enable the feature, follow the steps below:

1. Locate the file named 'hp54600.dot' in the following default directory:
   \ Program Files \ Hewlett-Packard \ HP BenchLink XL \ HP54600
2. Select the above file, click the right mouse button, and then select Create Shortcut.
3. Move the shortcut copy of the file to the Microsoft Office Startup folder:
   \ Program Files \ Microsoft Office \ Office \ Startup

Select the Local Language

1. Click About HP 54600 Scope Toolbar on the toolbar.
2. Click the Select Language tab.
3. Select the desired language. The dialog boxes and help system will appear in the selected language.
4. Click OK.
Technical Support

Complimentary Start-Up Assistance

Terms and Conditions

Hewlett-Packard (HP) will provide Start-Up Assistance at no charge to resolve questions relating to the installation, operation, and use of this software product. Start-Up Assistance is available to help you install the software on your PC, establish communication with a compatible instrument, and answer questions relating to the functionality of the software components provided by HP. Start-Up Assistance does not support requests to modify or enhance the functionality of the software. For services not covered by Start-Up Assistance, you may be referred to fee-based services for advanced assistance.

HP will make reasonable efforts to respond to each customer request for Start-Up Assistance within two working days, but is under no obligation to respond within a prescribed time frame. Requests for Start-Up Assistance are handled in the order in which they were received. HP will make reasonable efforts to solve customer problems, but cannot guarantee success.

Hewlett-Packard reserves the right to terminate Start-Up Assistance at any time without notice.
# Contacting HP for Technical Support

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<td>1 800 629 485</td>
<td>03 9272 0749</td>
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<td>Austria</td>
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<td>(0180) 524-6335</td>
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<td>Brazil</td>
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<td>(+55 11) 7297-8171</td>
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<tr>
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<td>1-800-88-8848</td>
<td>603-298 9157</td>
<td><a href="mailto:hp-direct_my@hp.com">hp-direct_my@hp.com</a></td>
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<tr>
<td>Mexico</td>
<td>(5) 258-4209</td>
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<tr>
<td>Netherlands</td>
<td>020 547 6669</td>
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<td>New Zealand</td>
<td>0800 738 378</td>
<td>04 802 6881</td>
<td><a href="mailto:info_hptmo@aus.hp.com">info_hptmo@aus.hp.com</a></td>
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<tr>
<td>Norway</td>
<td>+47 2273 5759</td>
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<td>Pakistan</td>
<td>92-51-818-959</td>
<td>92-51-816-190</td>
<td><a href="mailto:Mushkoib@isb.compol.com">Mushkoib@isb.compol.com</a></td>
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<tr>
<td>Philippines</td>
<td>(632) 814-1066</td>
<td>(632) 811-1080</td>
<td><a href="mailto:HPPDirect-sales@hp.com">HPPDirect-sales@hp.com</a></td>
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<tr>
<td>Poland</td>
<td>+48 (022) 6087700</td>
<td>+48 (022) 6087600</td>
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<td>91 631 1469</td>
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<tr>
<td>Russia</td>
<td>+7-095-797 3500</td>
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<td>3744242</td>
<td>2754709</td>
<td><a href="mailto:Mindy-ml_chee@hp.com">Mindy-ml_chee@hp.com</a></td>
</tr>
<tr>
<td>South Africa</td>
<td>+27-11-806 1000</td>
<td>+27-11-444-1725</td>
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<td>941-597-863</td>
<td><a href="mailto:Dayankaru@sscomp.co.ae">Dayankaru@sscomp.co.ae</a></td>
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<td>46 8 444-2525</td>
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<td><a href="mailto:Messtechnik_support@hp.com">Messtechnik_support@hp.com</a></td>
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<td>(90/312) 468 87 78</td>
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<tr>
<td>United Kingdom</td>
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<td>01344-362852</td>
<td><a href="mailto:Uktmo_sales@hp.com">Uktmo_sales@hp.com</a></td>
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<tr>
<td>United States</td>
<td>800 452 4844</td>
<td>888-900-8921</td>
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<tr>
<td>Viet Nam</td>
<td>844-8-229808</td>
<td>844-8-229553</td>
<td><a href="mailto:Sysco.vn@hn.vn">Sysco.vn@hn.vn</a></td>
</tr>
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**Note:** In all other countries, please contact your local HP Representative or go to the HP web site at [www.tmo.hp.com](http://www.tmo.hp.com).