Web Application Developer's Guide

For Polycom® Phones Using Polycom® UC Software 4.0.1

BETA DRAFT

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Introduction

About This Guide

This Web Application Developers' Guide will show you how to install and use the Polycom Software Development Kit (SDK) to plan, create, and develop Web applications that will run on Polycom phones using UC Software.

All Polycom phones run the Polycom® UC Software. The current version is 4.0.1 and it can be downloaded from the Polycom Support web site. The Polycom Software Development Kit (SDK) can be downloaded from the Applications web page on the Polycom web site.

How This Guide is Organized

This guide is organized into three parts: Part I: Getting Started; Part II: Creating Your Application, and; Part III: References.

Part I: Getting Started

Chapter 1:Understanding Web Application Development on Polycom Phones gives you an overview of Web applications on Polycom phones. *Chapter 2: Before You Begin* provides a checklist of things you can do before you begin writing your Web application. *Chapter 3: Starting Your Own Application* gets you started writing your Web application.

Part II: Creating Your Application

Chapter 4: Writing Your Web Application shows you how to use the tools to write your Web application. *Chapter 5: Using Relevant UCS Configuration Parameters* is an account of the parameters you can configure, their values and description. *Chapter 6: Debugging and Troubleshooting* provides help for you when troubleshooting your Web application development.

Part III: References

Chapter 7:Miscellaneous Information provides miscellaneous information you might need when you write your Web application. *Chapter 8: Third Party Software* shows the copyright statements for the third-party software products that run on Polycom phones.

Who Should Read This Guide?

This guide is designed specifically to provide Web application creators with information for developing and deploying Web applications to Polycom phones. This guide is not intended for end users and does not provide user-level information on how to use any specific Web applications.

Before reading this guide, you should be familiar with the following:

- Basic text editors, or full IDE-like Eclipse or Microsoft Visual Studio for creating or writing code
- General application and software development best practices
- Adequate planning, creating, and testing resources needed to produce a fully deployable Web-based application
- Polycom phones and provisioning methods
- How to use an XML editor
- How to structure Web content in XHTML format – the XML-based configuration file format that the Polycom UC Software and its supported phones use

Conventions Used in This Guide

The icons illustrated in the following table are designed to alert you to various types of important information in this guide.

Table 1: Icons Used in this Guide

Name	*Icon*	*Description*
Note		The *Note* icon highlights information of interest or important information needed to be successful in accomplishing a procedure or to understand a concept.
Administrator Tip		The *Administrator Tip* icon highlights techniques, shortcuts, or productivity related tips.
Caution		The *Caution* icon highlights information you need to know to avoid a hazard that could potentially impact device performance, application functionality, or successful feature configuration.
Warning		The *Warning* icon highlights an action you must perform (or avoid) to prevent issues that may cause you to lose information or your configuration setup, and/or affect phone or network performance.
Web Info		The *Web Info* icon highlights supplementary information available online such as documents or downloads on support.polycom.com or other locations.

Name	*Icon*	*Description*
Timesaver		The *Timesaver* icon highlights a faster or alternative method for accomplishing a method or operation.
Power Tip		The *Power Tip* icon faster, alternative procedures for advanced administrators already familiar with the techniques being discussed.
Troubleshooting		The *Troubleshooting* icon highlights information that may help you solve a relevant problem or to refer you to other relevant troubleshooting resources.
Settings		The *Settings* icon highlights settings you may need to choose for a specific behavior, to enable a specific feature, or to access customization options.

A few typographic conventions, listed next, are used in this guide to distinguish types of in-text information.

Table 2: Typographic Conventions Used in This Guide

Convention	*Description*
Bold	Highlights interface items such as menus, soft keys, file names, and directories. Also used to represent menu selections and text entry to the phone.
Italics	Used to emphasize text, to show example values or inputs, and to show titles of reference documents available from the Polycom Support Web site and other reference sites.
Blue	Used for cross-references to other sections, chapters, or parts in this document.
Underlined Blue	Used for URL links to external Web pages or documents. If you click on text in this style, you will be linked to an external document or Web page.
Blue Text	Used for cross references to other sections within this document. If you click on text in this style, you will be taken to another part of this document.
`Fixed-width-font`	Used for code fragments and parameter names.

This guide also uses font styles to distinguish conditional information as listed in Table 3 as shown next.

Table 3: Writing Conventions Used in This Guide

Convention	*Description*
<MACaddress>	Indicates that you must enter information specific to your installation, phone, or network. For example, when you see *<MACaddress>*, enter your phone's 12-digit MAC address. If you see *<installed-directory>*, enter the path to your installation directory.
>	Indicates that you need to select an item from a menu. For example, **Settings** > **Basic** indicates that you need to select **Basic** from the **Settings** menu.
`parameter.*`	Used for configuration parameters. If you see a parameter name in the form `parameter.*` , the text is referring to all parameters beginning with `parameter`. See **Error! Reference source not found.** for an example.

Sample code is shown in this guide to assist you in writing your applications. All samples are presented as shown next.

Sample Code 1-1: Create a Link to Emulate Do Not Disturb Key Press on a Phone

```
<html>
    <body> <br/>
    Click on the link to engage the DND feature
    <a href="Key:DoNotDisturb">DNDSettings</a>
    </body>
    <softkey index="1" label="Back" action="SoftKey:Back" />
    <softkey index="2" label="Exit" action="SoftKey:Exit" />
</html>
```

Recommended Software Tools

Polycom recommends that you use an XML editor – such as XML Notepad – to create and edit configuration files. In this way, all configuration files that you create will be valid XML files.

If the configuration files you create are not in the form of a valid XML structure, they will not load correctly on the phones and an error message will be logged to the provisioning server.

For more complex applications, you may need to use a fully Integrated Development Environment (IDE) like Eclipse or Microsoft Visual Studio.

Recommended References

You can locate the Polycom UC Software 4.0.1 Administrators' Guide on the Polycom Support Web site.

You can locate all Technical Bulletins, Feature Descriptions, and Notifications referred to in the Administrators' Guide on the Polycom Support Web site.

You can find all Polycom phone documentation on the Polycom Support Web site.

You can find Request For Comments (RFC) documents by entering the RFC number.

You can find an HTML Reference at http://www.w3.org/standards/webdesign/ .

For other references to Web information, see References or look for the Web Info icon:

Getting Help and Support

If you are looking for help or technical support for your phones, the following types of documents are available:

- Quick Start Guides, which describe how to assemble phones
- Quick User Guides, which describe the basic phone features
- User Guides, which describe both basic and advanced phone features
- Administrators' Guide, which provides instructions for installing, provisioning, and administering Polycom phones
- Feature Descriptions and Technical Notifications such as Feature Profiles, Engineering Advisories, Technical Bulletins, and Quick Tips that describe workarounds to existing issues and provide expanded descriptions and examples
- Release Notes, which describe the new and changed features and fixed problems in the latest version of the software

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For support or service, please contact your Polycom reseller or visit support.polycom.com for software downloads, product document, product licenses, troubleshooting tips, service requests, and more.

We are striving to improve our documentation quality, and would appreciate your feedback. Email your comments to VoiceDocumentationFeedback@polycom.com.

Polycom recommends that you record the phone model numbers, software (both the Updater and UC Software), and partner platform for future reference.

Phone models: _____

Updater version: _____

UC Software version: _____

Partner Platform: _____

Check out the Polycom Technology and Solution Developer's Forum at the Polycom Community.

Part I: Getting Started

Part I gives you an overview of Web application development on the Polycom® phones and of the Polycom UC Software and consists of the following chapters:

- Chapter 1: Understanding Web Application Development on Polycom Phones
- Chapter 2: Before You Begin
- Chapter 3: Starting Your Own Application

Chapter 1: Understanding Web Application Development on Polycom Phones

This chapter introduces the Microbrowser, which is available on certain Polycom® SoundPoint® IP and SoundStation® IP phones, and VVX ® 1500 phones running SIP 3.1.3 or earlier. This chapter also introduces the Browser, which is available on VVX 1500 phones running SIP 3.2 or later, and SpectraLink® 8400 Series wireless handsets running Polycom® UC Software 4.0.0 or later.

Polycom has two different application development environments for Polycom phones running Polycom UC Software. Choose the one that provides the best mapping to the phone models you want to write applications for. This guide is intended to provide an overview of each development environment and example applications that will run in each environment.

This chapter covers the following topics:

- Running Web Applications on Polycom Phones
- What is the Browser?
- What is the Microbrowser?
- What Makes the Microbrowser and Browser Different?
- What's in the Software Development Kit?
- What's New in Polycom UC Software 4.0.1?

Admin Tip: What Else Do You Need to Create Applications?

You can use whichever development languages or servers you choose, including Javascript, PHP, Python, Django, Tomcat or Apache. Use whichever tools you are most comfortable using, or those that are most supported by your IT department.

Web Info: Support for Polycom Phones

You can find all documentation for all Polycom phones on the Polycom Support site. Choose your phone model for specific documentation. For more information, contact your Polycom distributer.

Running Web Applications on Polycom Phones

Web applications running on Polycom phones can be as simple as a list of contacts or as complex as a nurse call system. The target phone's screen size is one of the determining factors when developing applications. Certain Polycom phones support a full Browser, where users can interact with Web pages as they would on a computer. Other Polycom phones support a Microbrowser, which supports a limited set of XHTML commands and displays limited content. For a list of which Polycom phones support a Browser as opposed to a Microbrowser, see What is the Browser? and What is the Microbrowser?

What is the Browser?

When a URL is configured on the phone or device, the Browser enables the user to browse and interact with Web pages - just like any Web browser. The Browser supports Web-browsing functionality that is similar to Google Chrome and Apple Safari.

The browser is based on the powerful and popular open source WebKit platform. The version can be found in the user-agent string. The user-agent string can be seen in network captures in the User-Agent HTTP header.

The Browser supports true Web 2.0 applications with the following features:

- XHTML 1.1
- HTML 4.01 with partial support for HTML 5
- CCS 2.1 with partial support for CCS 3.0
- SVG 1.1 (partial support)
- JavaScript
- XMLHttpRequest
- DOM
- HTTP 1.1
- AJAX

Note: Support for HTML5 Audio and Video Tags

The VVX 500 phone's Browser has HTML5 audio and video tag support. These tags are not yet supported by the VVX 1500 browser or the SpectraLink 8400 Series Browser.

The browser display is limited by the total display area available on each Polycom phone model. The display area may be a factor in the design of your Web application if you are creating an application for a specific model. Table 1-1: Polycom VVX 500 and 1500 and SpectraLink 8400 Series Screen and Browser Window Sizes shows the total screen size (in pixels) for each phone model.

The (X)HTML pages displayed on the Browser can contain static or dynamic information.

Users can access existing applications the using the Home screen **Applications** key or icon on the VVX 1500, VVX 500, or SpectraLink 8400 Series handsets.

Table 1-1: Polycom VVX 500 and 1500 and SpectraLink 8400 Series Screen and Browser Window Sizes

Phone	*Total Screen Size (pixels)*	*Full Browser Screen Size (pixels)*	*Idle Browser Screen Size (pixels)*
VVX 500	320x 240	320 x 200 (when tool bar auto-hide is disabled) 320 x 240 (when toolbar auto-hide is enabled)	320 x 158
VVX 1500[1]	800 x 480	800 x 395	610 x 360
SpectraLink 8400 Series	240 x 320	240 x 295 pixels with no soft keys displayed, 240 x 270 pixels with soft keys displayed	Not applicable

[1] When running SIP 3.2.2 or later.

What is the Microbrowser?

The Microbrowser is a name Polycom gives to the smaller, limited-capability browser available on phones that feature smaller display screens. Although its functions are similar to the Browser version available on phones with larger displays, the Microbrowser supports only a subset of the XHTML 1.0 features available to the Browser. For example, it can connect to Web servers hosted on the Internet or intranet to display XHTML pages, but it does not have full Web browser functionality.

The XHTML pages displayed on the Microbrowser can contain static or dynamic information. This information is defined as follows:

- **Static XHTML** These pages are created using XHTML editors and hosted by the Web server. These pages are accessed from the Microbrowser (using HTTP protocol). These XHTML pages are called static, because the information that is displayed is already coded into the XHTML pages. These pages do not include information that keeps changing or contact other services for updates.
- **Dynamic XHTML** These pages involve dynamic information updates of XHTML pages by an application hosted on the Web server. The application residing on the Web server will get information from an intranet or through the Internet—data service providers like Yahoo, Exchange Server, Call Control Servers and other enterprise servers.

When a Web or intranet URL is configured, the Microbrowser downloads XHTML content into the phone's memory, and parses it to identify XHTML tags. The phone renders these tags onto the display screen. The pages will display according to the graphical capabilities and display size of the phone's

display screen. This means if you create complex Web pages, they may not display correctly on all devices.

The Microbrowser does not support scripting (such as JavaScript). All actions on data entered into forms are processed by the server using POST or GET methods.

Users can launch the Microbrowser on a SoundPoint IP or SoundStation IP phone by pressing the **Applications** key or it can be accessed through the **Menu** key by selecting **Applications**.

The Microbrowser is supported in part of the phone's total display area:

Table 1-2: Polycom SoundPoint IP, SoundStation IP, and VVX 1500 Screen and Microbrowser Window Sizes

Phone	*Total Screen Size (pixels)*	*Microbrowser Screen Size (pixels)*
SoundPoint IP 321/331/335	102 x 33	88 x 12
SoundPoint IP 450	256 x 116	171 x 72
SoundPoint IP 550/560/650/670	320 x 160	213 x 110
SoundStation IP 5000	240 x 68	240 X 32
SoundStation IP 6000	240 x 68	240 X 32
SoundStation IP 7000	255 x 128	255 x 79
SoundStation Duo[1]	240 x 68	240 X 32
VVX 1500[2]	800 x 400	562 x 322

[1] Only supported on the SoundStation Duo while in SIP mode (as opposed to PSTN mode).

[2] When running SIP 3.1.3 or earlier.

What is XHTML?

XHTML, or eXtensible HyperText Markup Language, is a family of XML markup languages that mirror or extend versions of the widely-used Hypertext Markup Language (HTML), the language in which web pages are written. XHTML is HTML 4.01 redesigned as XML.

You should ideally have experience working with HTML and XHTML programming or access to someone who has such experience to benefit from the information and discussion provided in this guide.

For more information, refer to the following online documents:

- W3C HTML 4.0.1 Specification
- W3C HTML 5 Specification
- W3C XHTML™ 1.0 The Extensible HyperText Markup Language (Second Edition)

- W3C XHTML™ Basic 1.1 - Second Edition
- W3C XHTML™ 1.1 - Module-based XHTML - Second Edition
- W3C XHTML Tables Module - XHTML™2.0

What Makes the Microbrowser and Browser Different?

The main difference between the Microbrowser and the Browser is that phones with larger displays using the Browser are capable of displaying more complex Web content when compared to the Microbrowser.

A comparison between the Microbrowser and the Browser is shown in the following table.

Table 1-3: Microbrowser and Browser Comparison

	Microbrowser	*Browser*
Supported On	SoundPoint IP 321/331/335, IP 450, IP 550, IP 560, IP 650, IP 670, SoundStation IP 5000, IP 6000, IP 7000, Duo[1], VVX 1500[2]	VVX 1500[3], SpectraLink 8400 Series, VVX 500
XML API	programmable soft keys, telephone integration URIs, push requests, telephone notification events, phone state polling	telephone integration URIs, push requests, telephone notification events, phone state polling
Capabilities	HTML 4.01 XHTML 1.0	XHTML 1.1. HTML 4.01 with partial support for HTML 5; CCS 2.1 with partial support for CCS 3.0; SVG 1.1 (partial support); JavaScript; XMLHttpRequest; DOM; HTTP 1.1; AJAX

[1] The Microbrowser is only supported on the SoundStation Duo when it is in SIP mode (as opposed to PSTN mode).

[2] When running SIP 3.1.3 or earlier.

[3] When running SIP 3.2.2 or later.

What's in the Software Development Kit?

The Polycom® Software Development Kit 2.0 (usually referred to simply as the *SDK*) provides you with a set of tools to help you to develop XML API/XHTML applications for the VVX 1500 phones and SpectraLink 8400 Series handsets. The SDK provides software-based simulators that emulate the following phones:

- A Polycom VVX 500 and 1500 phones with both the main and idle browsers
- A SpectraLink 8400 Series handset with the main browser and the bar code scanning simulation

The Polycom SDK 2.0 is available from the Polycom Support site . It can be installed in on any computer equipped with the following operating systems:

- Microsoft® Windows® XP Professional SP3
- Microsoft Windows Server 2003 Standard Edition SP2
- Microsoft Vista® SP2.

The computer must have at least a 2 GHz processor equipped with 512 MB of RAM, and 400 MB of available disk space.

The SDK installation file will install the following seven components on your computer:

- The VVX 500 simulator
- The VVX 1500 simulator
- The SpectraLink 8400 Series simulator
- An Apache Tomcat Web Server
- The XML API Web Testing Tool (optional)
- The XML API Standalone Testing tool (optional)
- The SDK Quick Start Guide

Admin Tip: What Else Do You Need to Create Applications?

You can use whichever development languages or servers you choose, including Javascript, PHP, Python, Django, Tomcat or Apache. Use whichever tools you are most comfortable using, or those that are most supported by your IT department.

What's New in Polycom UC Software 4.0.1?

If you've used previous versions of the Polycom SDK to develop applications in the past, you may notice differences in the latest capabilities supported by the phones or changes to the simulators themselves. This section covers the range of functional improvements that were introduced with UC Software 4.0.1.

Note: Supporting Legacy Phone Models

Certain phone models (referred to as 'legacy' phones) are not supported in the Polycom UC Software 4.0.x release. For the appropriate software versions to use with these legacy phones, see the Polycom software release matrix. The software matrix indicates the level of software support for each Polycom phone.

Support for the SpectraLink 8400 Series wireless handsets, the SoundStation Duo conference phone, and the VVX 500 business media phone was introduced in UC Software 4.0.x.

The following features were introduced with UC Software 4.0.x:

- Viewing a Line Registration Event
- Viewing a Line Unregistration Event
- Viewing a UserLogin/Logout Event
- Viewing a Call State Change Event

The following feature was changed with UC Software 4.0.x:

- Telephone Integration URIs
- New configuration parameters defined in Using Relevant UCS Configuration Parameters

Chapter 2: Before You Begin

Define the purpose of your application before you start to write it. You should decide what tasks the application is going to perform and how complex the application will be. Investigate your audience and understand their capabilities.

You should also decide whether your application will run on only one phone model or on several. You will need to take the varying screen sizes into account to determine a common size for your application.

Creating screen mockups of your application using a visualization tool such as PowerPoint or Visio will help speed your development process and help others that may be involved understand the overall application concept.

Planning Your XML API Interface Requirements

The XML API is supported for applications running on Polycom® SoundPoint® IP 321/331/335, 450, 550, 560, 650, and 670 desktop phones, SoundStation® IP 5000, 6000, and 7000 conference phones, SoundStation Duo conference phones, VVX® 500 and 1500 business media phones, and SpectraLink® 8400 Series wireless handsets running Polycom® UC Software 4.0.0.

This XML API is designed to provide you with a flexible way of developing Polycom phone applications, while tightly integrating into the phone's telephony capabilities and functions. The XML API features are supported by the Polycom Browser and Microbrowser, except where noted.

You'll find detailed descriptions and examples for the XML API features in *Getting to Know the XML API Application Interface*.

Best Practices During Web Application Development

As with any software development project, there are a range of approaches you can follow. If you are new to developing Polycom phone applications, it may help to know a few tips to use and pitfalls to avoid before you begin. Use the following lists for guidance to the best practices to use when developing applications to run on the Polycom Microbrowser and Browser.

Best Practices During General Web Applications Development

The following points apply when developing applications for the Browser or Microbrowser:

- **Using the HTTP User Agent** The application can use the HTTP user agent header information to determine a variety of details about the phone – such as the model – and deliver content tailored specifically for the phone's and screen size and other capabilities. Applications running on phones that support the Browser can also use JavaScript to detect the screen and/or window size.

- **Supported Image Formats** Most phone models support both JPG and BMP image formats. Where image size is a concern, compressed JPG images are better for large images. For smaller images, the BMP image format provides better quality but lacks the compression benefit. Keep in mind that certain low-end phones that support the Microbrowser do not support the JPGs format. For more information, see Image Tags.
- **Image Too Large for Screen** If an image is physically too large to fit a specific phone screen, ensure that the server is able to scale down the image first to fit the phone's screen dimensions. If the phone is forced to scale oversized images to fit the screen, phone performance will suffer.
- **Previewing Images** To preview how images will appear on the phone, set your computer monitor color depth to 16-bit. Ensure that any images that your application sends to the phone are prepared using a color depth that is equal to or lower than the phones color depth capabilities.
- **Using Soft Keys** If the phone model you are developing your application for supports soft keys or shortcuts, take advantage of these by adding them to your application. You can use the configuration file to set up soft keys and shortcuts.
- **Encrypting Configuration Files** If the phone MAC address is tagged in its HTTP request through a configuration file for identification purposes, ensure the HTTPS site encrypts this information.
- **Pushing Sensitive Data** Avoid pushing security sensitive data direct to the phone. A URL push can be used to push a request to the phone to get the information from a HTTPS site, so the data will be encrypted. The URL push itself should not leak sensitive information.
- **Using HTTPS for Telephone Notification Events** Be sure to use HTTPS for telephone notification events and state polling because they contain sensitive information such as the phone MAC address, caller name and phone number.
- **Implement a User Confirmation** When including emergency push notifications, be sure to implement a user confirmation response. In cases where the push and call happen simultaneously, the push message could be lost or hidden without the user realizing the event occurred. Adding a confirmation response will ensure the user receives the notification.
- **Using Tel URI** Your application should use TelUri API to make call instead of using digit key press simulation for dialing to improve the performance. For more information, see Telephone Integration URIs.
- **Soft Key Positions May Move** When working with the simulators, simulating key presses for call screen soft keys such as **EndCall** and **Transfer** for call controls may not be reliable. This is because the soft key position can move depending on the phone's configuration. Instead, use a hard key press simulation, provided the phone supports this function.
- **Remove white space in code** Process HTML, JavaScript, and CSS files to remove whitespace and shrink before delivery. A number of free whitespace strippers and JavaScript / CSS optimizers are available online.

Best Practices During Browser Web Applications Development

The following points apply when developing Polycom phone applications specifically to support the capabilities of the Browser:

- **Idle Browser Refresh Cycle** There is a manual retrigger mechanism by touching the idle screen on the Polycom® VVX® 1500 phone, so the idle browser refresh cycle should be set to 0.
- **No text input on idle browser** The idle browser (when available) is interactive, but should not be used for text input. If text input is required, a link should be provided to invoke the page displayed on the main Browser.
- **Appropriate link area for pressing/selecting** Links should be made big enough to be finger-friendly. For example, embedding a button inside the link should be avoided.
- **When sharing the idle browser** The idle browser (when available) can be shared by multiple applications, for example using iframe AJAX running in the background of a hidden browser can have an impact on battery life of the SpectraLink® 8400 Series wireless handsets. Carefully consider what the page might do even when the user is not looking at it. Consider monitoring the OnUnload JS event. Use the PolyUri DOM extensions PolyUri.shownSig and PolyUri.hiddenSig to trigger behavior when your application hidden or shown. Consider that your JavaScript may be running on a battery operated device and running heavy AJAX, when the browser is not visible, is detrimental to battery life and may not be adding a lot of value to the user.

Best Practices During Microbrowser Web Applications Development

The following points apply when developing Polycom phone applications specifically to support the capabilities of the Polycom Microbrowser:

- **Minimal information on the screen** The application should just deliver enough information to the screen size of the idle browser. Excessive information cannot be viewed and will slow down the performance of the phone and waste the bandwidth, because the idle browser has no scrolling capability.
- **No interactive application on idle browser** The applications should be informational only. They should not contain user input elements like soft keys, buttons, or input, because the idle browser is not interactive.
- **Provide explicit instructions for users** If Select soft key is enabled on an idle page to invoke a URL, there should be an obvious indication like ‘Press Select’ on the idle page. Do not assume that the user will know to press the Select soft key (or that it will invoke a URL if it is enabled by the HTTP response header of the idle page).
- **Keep the refresh rate down** The application should not require a frequent refresh of idle browser (a minimum 5 second delay is enforced by the phone).

- **Control refresh cycle in the server** The idle browser refresh cycle should be controlled by the server through its response HTTP. The configured refresh cycle in the configuration file should be as long as possible and only used as a recovery mechanism in the case where the HTTP connection fails due to a network problem.
- **Limit page content to reasonable size** If a page contains too much information, multiple pages should be used to avoid delay in displaying the page and scrolling. Keep in mind that the phone has a limitation on displaying the content due to its memory limitation.
- **Provide adequate text elements** If a form contains text inputs and soft keys, a link should be added next to the text input, so the cursor can be moved out of the text box easily to display the designed soft keys to perform the function.
- **Limit cursor navigations** If a page includes multiple buttons or links, soft keys should be considered as additional input methods for frequently used selection to avoid cursor navigations.

Chapter 3: Starting Your Own Application

You want to write an application that runs on one or more models of Polycom phones. This chapter provides instructions on the following topics:

- Installing and Launching the Polycom SDK
- Getting to Know the XML API Application Interface

Installing and Launching the Polycom SDK

The Polycom SDK 2.0 is set of tools designed to assist you in developing XML API/XHTML applications for the VVX 500 and 1500 phones and SpectraLink 8400 Series handsets, providing a simulation of the following:

- A Polycom VVX 500 and 1500 phone with both the main and idle browsers
- A SpectraLink 8400 Series handset with the main browser and the bar code scanning simulation

The Polycom SDK 2.0 is available from the Polycom Support site .

Note: Application Launch Issues

The SDK creates temporary files in the installed directory at startup. By default, Microsoft Windows Vista does not allow applications to modify/add files in certain directories due to security concerns. To workaround this issue, either:

- Turn off the User Access Control (UAC) feature.
- Install the SDK in another directory besides Program Files or Windows. For example, during the installation process, enter c:\PolycomSDK as the install directory.

Note: Differences Between Applications Running on Phones and the SDK

It is important to consider the difference between an application running on the computer-based simulator and the same application running on a real Polycom phone. Graphics animation and other processor or memory intensive functions could perform differently in either environment. There may be other slight differences in the behavior of the simulators with respect to different versions of phone software.

Troubleshooting: Before Running the Simulator

The simulator uses port 80. If any existing applications on the computer are using port 80, they should be shut down. If your computer is running a Web server, be sure to shut this down before running the simulator.

The simulator executable will install seven components:

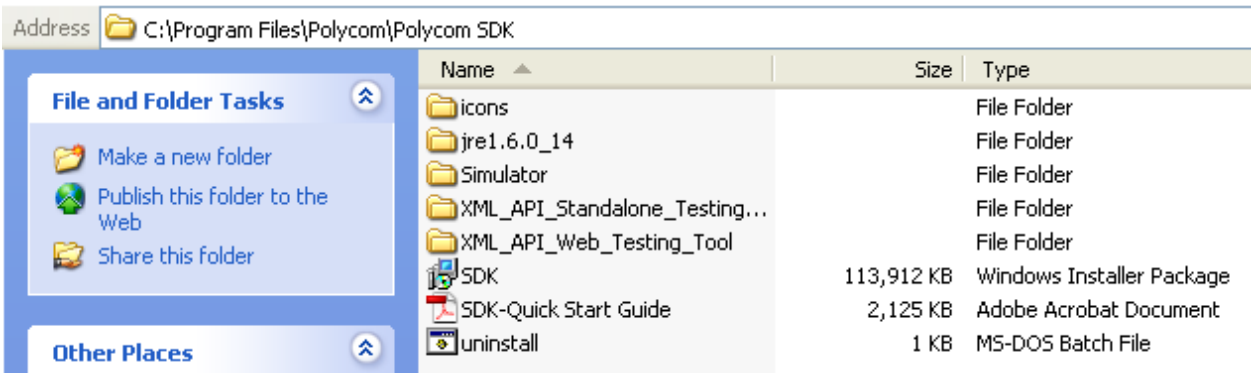
- The VVX 500 simulator
- The VVX 1500 simulator
- The SpectraLink 8400 Series simulator
- An Apache Tomcat Web Server
- The XML API Web Testing Tool (optional)
- The XML API Standalone Testing tool (optional)
- The SDK Quick Start Guide

Installing the SDK

The Polycom SDK 2.0 is available for download from the Polycom Support site. Before downloading, you will be required to submit a registration form.

Save the **web_apps_sdk.zip** file on your target computer. Extract **SDK_SIP_4_0_0.exe** to your computer.

Install the SDK to the default location, c:\Program Files\Polycom\Polycom SDK. The Polycom SDK contents are shown next.



For more detailed information on the VVX 500 simulator, the VVX 1500 simulator, the SpectraLink 8400 simulator, the XML API Web testing tool, and the XML API Standalone testing tool, see the Polycom SDK Quick Start Guide.

The following application shortcuts are created on your desktop:

	Start the SpectraLink 8400 simulator
	Start the VVX 500 simulator
	Start the VVX 1500 simulator
	Start the standalone testing tool
	Start the web testing tool

Launching a Phone Simulator

You can start a simulator by clicking on the appropriate application shortcut on your desktop:

- **Start VVX 500 Simulator**
- **Start VVX 1500 Simulator**
- **Start SpectraLink 8400 Simulator**

You can also start a simulator by choosing:

- **Start > Programs > Polycom > SDK > VVX 500 Simulator > Start VVX 500 Simulator**
- **Start > Programs > Polycom > SDK > VVX 1500 Simulator > Start VVX 1500 Simulator**
- **Start** > **Programs > Polycom > SDK > SpectraLink 8400 Simulator > Start SpectraLink 8400 Simulator**

Getting to Know the XML API Application Interface

XML API support for applications exists on SoundPoint IP 321/331/335, 450, 550, 560, 650, and 670 desktop phones, SoundStation IP 5000, 6000, and 7000 conference phones, SoundStation Duo

conference phones, VVX 500 and 1500 business media phones, and SpectraLink 8400 Series wireless handsets running Polycom UC Software 4.0.0 or later.

This XML API is intended to provide you with flexibility in developing applications on Polycom phones, while tightly integrating into the phone's telephony capabilities and functions. The XML API features are supported by the Microbrowser and Browser, except where noted.

This support includes:

- Programmable Soft Keys
- Telephone Integration URIs
- Using Push Requests
- Using Telephony Notification Events
- Phone State Polling

Notes on API Security

With respect to the security of the XML API, the following should be noted:

- **Authenticating remote control and monitoring** The execution of each of each HTTP GET/POST request requires an MD5 digest authentication. The execution of each HTTP PUSH request supports MD5 digest authentication as well as TLS and HTTPS. All pushed URLs are relative URLs with the root specified in the applications.cfg configuration file.
- **Achieving confidentiality of executed content** The phone's HTTP client supports Transport Layer Security (TLS), so any data retrieved from the URL can be protected. Make sure of the confidentiality of all traffic past the initial push request by specifying a root URL that uses https.
- **Event reporting** The confidentiality of all events reported by the phone can be also be protected by TLS in the same way that push content is.
- **Direct data push** When direct data push is enabled—disabled by default— small amounts of content (1KB) can be sent directly to the phone by the application server. The request will still be authenticated through HTTP digest, but all content will be in clear text on the network. Polycom recommends that you only use unencrypted data push for broadcast type alerts that do not pose any confidentiality risks.

Both `apps.push.username` and `apps.push.password` must be set for data push to be enabled.

Programmable Soft Keys

Soft keys are programmed using tags that create soft keys like the UC Software does. Soft keys appear on the bottom of the screen on Polycom phones (see Figure 4-4: VVX 1500 Idle Browser).

The following programmable soft key tag is supported:

- **<softkey>** Defines a soft key

Note: Not Supported on VVX500, VVX1500 phones and SpectraLink 8400 Series Handsets

The programmable soft key tag is not supported in the Browser on VVX 500 and 1500 phones and SpectraLink 8400 Series wireless handsets. However, the same functionality can be created when in the browser through HTML button tag: <button></button> or through JavaScript soft key hooks. For more information, see JavaScript Examples for the Browser.

The *<softkey>* tag enables you to create a soft key with a customizable label, position, and action. Users can execute the actions by pressing the soft key on their phone.

You can use soft keys within the interactive Microbrowser only.

Use the following format when configuring the *<softkey>* tag:

```
<softkey index="W" name="X" label="Y" action="Z" />
```

The *<softkey>* tag supports the attributes listed in the table shown next.

Table 3-1: *<softkey>* Tag Attributes

Attribute	*Permitted Values*
index Position of the soft key.	**Numeric, 1 to 8**
name Text displayed on soft key when `Softkey:Submit` action is used. It is ignored for all other actions. Use in cases where more than one `Softkey:Submit` action appears on a page.	**String**
label Text displayed on soft key. The maximum length is 9 characters.	**String**
action Supported actions (must be one of those listed in the table shown next).	**URI**

[1] If empty or absent, default action name is displayed.

Table 3-2: Supported Actions in *<softkey>* Tag

Action	*Default Action Name*	*Description*
SoftKey: Home	Home	Move to configured home page.
Softkey:Back	Back	Move to previous page
SoftKey:Exit	Exit	Exits Microbrowser or Browser

Action	*Default Action Name*	*Description*
SoftKey:Cancel	Cancel	Cancel action
SoftKey:Refresh	Refresh	Refreshes current page
SoftKey:Fetch; <URI>	Fetch	Fetches the page from the given URI
SoftKey:Reset	Reset	Clears all input fields in the form
SoftKey:Submit	Submit	Submits the form
Key:VolDown	VolDown	Decreases volume by 1 unit
Key:VolUp	VolUp	Increases volume by 1 unit
Key:DoNotDisturb	Do not disturb	Enables Do Not Disturb feature
Key:Headset	Headset	Enables use of microphone
Key:Handsfree	Hands-free	Enables use of speaker
Key:Messages	Messages	Open the **Messages** menu
Key:Applications	Applications	Open the **Applications** menu
Key:MicMute	Mute	Mutes the phone when the call state
Key:Directories	Directories	Open the **Directories** menu
Key:Menu	Menu	Opens the main menu
Key:Setup	Setup	Opens the main menu **Settings** menu

Depending on the browser state, a number of predefined soft keys exist as described in the table shown next.

Table 3-3: Predefined Soft keys and Their Action

Action	*Predefined Soft Key*
Browser Active—fetching pages or rendering data	Home, Refresh, Back, Stop
Browser Stop—accept	A comma separated list of content types that the server that processes this form will handle correctly.

Action	*Predefined Soft Key*
Edit Active—accept-charset	A comma separated list of possible character sets for the form data. The default value is 'unknown'.

Note: When Soft Keys Override Custom Soft Keys

The soft keys from the 'Browser Active' and 'Edit Active' soft key groups override any custom soft keys defined in the current XHTML. The soft keys from the 'Browser Stop' soft key group appear if no custom soft keys are defined. The exact soft keys that appear vary between the SoundPoint IP and SoundStation IP phones.

Keep in mind the following important notes regarding <*softkey*> tags:

- All actions are case *sensitive,* meaning the correct character case is required.
- If you leave the soft key action name empty, the soft key tag is ignored.
- The Reset and Submit soft key tags must exist inside the `<form>` tag that they are to act upon.
- On the VVX 1500 phone, the **Reset** and **Submit** soft key tags can exists inside a single form element. If there are multiple forms inside an XHTML document, the XHTML Submit and Reset input elements must be used.
- Indexes need not be sequential. A missing index will result in an empty space, no soft key displayed.
- An index greater than eight is ignored.
- By default, a **Back** soft key is placed on the graphic display (even if one is not defined).

Note: When the Back Soft Key Will Not Appear

When `mb.main.autoBackKey` is set to 0, the Back soft key will not appear.

- When using more than one Submit soft key on page, use the name to distinguish between them.

For example, to create a simple page:

Sample Code 3-1: Hello World

```
  <html>
      <p> Hello World! </p><br/>
      <softkey index="1" label="Home" action="SoftKey:Home" />
      <softkey index="2" label="Refresh" action="SoftKey:Refresh" />
      <softkey index="4" label="Exit" action="SoftKey:Exit" />
      <softkey index="3" label="Back" action="SoftKey:Back" />
</html>
```

Telephone Integration URIs

Internal Uniform Resource Identifiers (URIs) provide the interface to execute predefined actions on the phone. These actions are similar to the manual execution of key presses by the user.

There are three ways to execute an internal URI action, as follows:

- If the file sent to the phone contains only internal URI actions, the file content type must be `application/x-com-polycom-spipx`. The internal URIs are executed in ascending order.

  The internal URIs can be sent as Data Push where content type must be `application/x-com-polycom-spipx`.
- If an XHTML file will include internal URI, they must be defined in (and executed from) anchor tags, in the href attribute (for example, Menu). When the user selects the anchor, the action is processed and executed.
- Use one of the following soft key actions in anchor tags:
  - SoftKey:Home
  - SoftKey:Back
  - SoftKey:Exit
  - SoftKey:Cancel
  - SoftKey:Refresh

  See Programmable Soft Keys.

Note: Executing Internal URIs

Internal URI actions contained in a file with content type "application/x-com-polycom-spipx" can be executed only through a URL push.

Use the following format when configuring the internal URIs:

```
ActionType:Action
```

where:

- ActionType is a type of key or action to execute (Key, Softkey, Tel, or Play)
- Action is the name of the action to be executed.

The supported internal URIs are described in the table shown next.

Table 3-4: Supported Internal URIs

Action Type	*Action*
Key	**Line1 to Line48, DialPad0 to DialPad9, Softkey1 to Softkey5, DialPadStar, DialPadPound, VolDown, VolUp, Headset, Handsfree, MicMute, Menu, Messages, Applications, Directories, Setup, ArrowUp, ArrowDown, ArrowLeft, ArrowRight, Backspace, DoNotDisturb, Select, Conference, Transfer, Redial, Hold, Status, Call List**
The Key URIs send the key press event to the phone. The phone processes this event as if the button had been physically pressed.	
SoftKey[1]	**Back, Cancel, Exit, Home, Refresh, Reset, Submit, Fetch**
The SoftKey URIs send the soft key press event to the phone. The phone processes this event as if the associated soft key had been physically pressed. These URIs function when the interactive Microbrowser is on the screen. ***Note***: The programmable soft key related URIs are not supported on the Browser on the Polycom VVX 500 and 1500 phones and SpectraLink 8400 Series handsets.	
Tel[23]	**Number;LineIndex;ext=<extension_no>**
The Tel URI initiates a new call to the specified number on the specified line. The line number is optional (if not supplied then the first available line is used). The digit map rules are followed (see 'Digit Map' in the Polycom UC Software Administrators' Guide).	

Action Type	*Action*
Play[4]	**Play:<audiofile_path>**
Download and play the audio file. The supported audio formats are G.711mu-law, G.711a-law, and Liner16. The <audiofile_path> is the relative path on the application server, relative to `apps.push.serverRootURL`. The supported maximum file size is determined by `res.finder.sizeLimit`. For G.711mu-law and G.711a-law files, sample rate must be 8ksps with a sample size of 8. This is supported on all phones. For Liner16 files: • Sample size must 16 for all sample rates. • Sample rate of 16ksps is supported on SoundPoint IP 321/331/335, 450, 550, 560, 650, and 670, SoundStation IP 5000, 6000 and 7000, VVX 500 and 1500, and SpectraLink 8400 Series. • Sample rate of 32ksps and 48 ksps is supported on SoundStation IP 5000, 6000 and 7000, VVX 1500, and SpectraLink 8400 Series. • Sample rate of 8ksps and 44.1 ksps is supported on VVX 500 and 1500 and SpectraLink 8400 Series.	
Action	**UpdateConfig**
Update the phone's configuration. This action works the same as selecting **Menu > Settings > Basic > Update Configuration**. The phone may or may not reboot (depending on which configuration parameters have changed).	

[2] The LineIndex value is case insensitive. The range of LineIndex is 'Line1' to 'Line48'.

[3] If the line corresponding to the LineIndex in the Tel action is busy, the existing call on that line is held and a call is placed to the number specified in the Tel URI on that given line.

[4] An error is logged in a log file, if the file is too large to play.

Keep in mind that the following important notes regarding internal URIs:

- The action name and key type are case sensitive.
- For non-XHTML content containing only internal URIs, the internal URIs are executed in the order they appear in the file without any delay.
- If any URI is invalid and it is in a file of only internal URIs, the entire file is rejected.
- If any invalid URI is present in a XHTML file, the execution of that URI is ignored.

For example, to create a link that behaves as if you pressed the Do Not Disturb key:

Sample Code 3-2: Simulate Pressing of Do Not Disturb Key

```
<html>
    <body> <br/>
    Click on the link to engage the DND feature
    <a href="Key:DoNotDisturb">DNDSettings</a>
    </body>
    <softkey index="1" label="Back" action="SoftKey:Back" />
    <softkey index="2" label="Exit" action="SoftKey:Exit" />
</html>
```

For example, to place a call to ***50**, and then wait two seconds before entering **44**:

```
<html>
    <head>
    </head>
    <body>
        <a href="tel:*50;postd=,44">Push to Talk</a>
    </body>
</html>
```

Note: How to Indicate Pauses

A two-second pause is indicated by the , (comma). A one-second pause is indicated by a **p** character. The dual-tone multi-frequency (DTMF) is sent after the placed call is connected.

Using Push Requests

A push request is defined as an XML formatted request that you send to a phone to tell it to process the XML content. The phone may render the data, fetch a URL, or perform an action.

You enable this feature in the **applications.cfg** configuration file. See Configuring Push Request Parameters.

HTTP <URL> Push

The HTTP URL push enables an application to push a URL to a phone for its Microbrowser or Browser to open, such as an HTML Web page for display. The value sent within the push request is 'relative' because it is relative to the URL configured by the `apps.push.serverRootURL` configuration parameter (the pushed URL is appended to this 'root' URL, and this is what the Microbrowser or Browser will attempt to open). This feature is asynchronous, because once the push request is received by the phone, it returns a 2xx or 4xx response immediately, without waiting. There will be no

success/failure feedback for the push handling itself. The pushing application will not know if the Microbrowser or Browser was able to open the pushed URL or not.

Use the following format when configuring the HTTP URL Push:

```
<URL priority="X" >URI path</URL>
```

The URL push requests support the attributes listed in the table shown next.

Table 3-5: URL Push Request Attributes

Attribute	*Permitted Values*
priority[1]	**Critical, Important, High, Normal**
Sets the priority of the push, which determines how and when the URL is requested. For more information, refer to the following table.	
URI path[2]	**String**
Any relative URI (or relative URI path) on the configured application server.	

[1] If attribute is absent, **Normal** is used.

[2] Currently multiple URIs in a single push request are not supported.

Note: Where PolycomIPPhone Tags Must Be Defined

The <URL> tag must be defined under a <PolycomIPPhone> root tag. For example:

```
<PolycomIPPhone>
    <URL priority="Normal">/examples/media.xhtml</URL>
</PolycomIPPhone>
```

The following table describes the results of using a specific priority when the phone is in different states.

Table 3-6: How Priority Affects URL Push Requests

Phone State	*Priority*	*Description*
Idle State	Critical	The phone will display push request immediately.
	High	The phone will display push request immediately.
	Important	The phone will display push request immediately.
	Normal	The phone will display push request immediately.
Non-Idle State	Critical	The phone will display push request immediately.

Phone State	*Priority*	*Description*
	High	The phone will display push request immediately, but it will appear after critical push requests. The phone will check whether the last processed message is of same or higher priority. If it is same or higher priority, then the phone will wait until the phone returns to the idle state before displaying the message.
	Important	The phone will display push request immediately, but it will appear after critical and high push requests. The phone will check whether the last processed message is of same or higher priority. If it is same or higher priority, then the phone will wait until the phone returns to the idle state before displaying the message.
	Normal	The phone will ignore push request in push queue until the phone returns to the idle state.

Keep in mind the following important notes regarding HTTP URI push:

- The URI that the phone ultimately ends up fetching is a concatenation of the apps.push.serverRootURL and the URI sent in the Push URL message.
- By default, a **Back** soft key is placed on the graphic display.
- The Back soft key will not appear when `mb.main.autoBackKey` is set to 0 or when custom soft keys are shown using JavaScript; otherwise it will appear.
- Push requests are displayed as 'first-in-first-out' except for noted in the table above.
- All HTTP requests are challenged through HTTP Digest Authentication.
- If the phone cannot fetch the content from the pushed URI, the request is ignored.

For example, if apps.push.serverRootURL is configured in a phone to be http://1.2.3.4/apps then to push the display of a XHTML page *media.xhtml*, you would send the following XHTML:

```
<PolycomIPPhone>
    <URL priority="Normal">/examples/media.xhtml</URL>
</PolycomIPPhone>
```

where *media.xhtml* is hosted by a web server at http://1.2.32.4/apps/examples/media.xhtml.

HTML <Data> Push

The data push enables you to send XHTML page content directly to a phone, without the overhead of the phone having to fetch the XHTML.

Use the following format when sending the HTML Data Push:

```
<Data priority="X" >Y</Data>
```

The HTML push requests support the attributes listed in the following table.

Table 3-7: HTML Push Requests

Attribute	*Permitted Values*
priority[1]	**Critical, Important, High, Normal**
Sets the priority of the push, which determines how and when the URL is requested. For more information on how priority affects HTML push requests, see the following table.	
text[2]	**Text in HTML format**
Any text.	

[1] If attribute is absent, **Normal** is used.

[2] The maximum content length for push request is 2KB.

Note: Where Tags are Defined

The <Data> tag must be defined under a <PolycomIPPhone> root tag. For example:

```
<PolycomIPPhone>
    <Data priority="Important"> <h1> Fire Drill at 2pm </h1>
Please exit and congregate at your appropriate location outside
</Data>
</PolycomIPPhone>
```

The following table describes the results of using a specific priority.

Table 3-8: How Priority Affects HTML Push Requests

Phone State	*Priority*	*Description*
Idle State	Critical	The phone will display push request immediately.
	High	The phone will display push request immediately.
	Important	The phone will display push request immediately.
	Normal	The phone will display push request immediately.
Non-Idle State	Critical	The phone will display push request immediately.
	High	The phone will display push request immediately, but it will appear after critical push requests. The phone will check whether the last processed message is of same or higher priority. If it is same or higher priority, then the phone will wait until the phone returns to the idle state before displaying the message.

Phone State	*Priority*	*Description*
	Important	The phone will display push request immediately, but it will appear after critical and high push requests. The phone will check whether the last processed message is of same or higher priority. If it is same or higher priority, then the phone will wait until the phone returns to the idle state before displaying the message.
	Normal	The phone will ignore push request in push queue until the phone returns to the idle state.

For example, to push the display of an important message:

```
<PolycomIPPhone>
    <Data priority=”Important”> <h1> Fire Drill at 2pm </h1> Please exit
and congregate at your appropriate location outside </Data>
</PolycomIPPhone>
```

For example, to push the URIs for execution:

The content type must be “`application/x-com-polycom-spipx`”.

```
<PolycomIPPhone>
    <Data priority=”Important”> Key:Line1
Key:DialPad0
Key:DialPad1
</Data>
</PolycomIPPhone>
```

Using Telephony Notification Events

Telephony events allow application programs insight into what the phones are doing. Using a combination of them will allow an application to detect the power up of phones, the signing on of users, and the state of the phones.

For example using a combination of events can allow an application to:

- Detect that a phone has registered
- Detect that a user has logged into a specific phone in an environment where users grab any phone at the start of their workday (Line Registration Event + User Login Event).

The phone can be configured to send information to a specific URI if one of the following telephony notification events occurs:

- Incoming Call Event
- Outgoing Call Event

- Offhook Event
- Onhook Event
- Phone Lock Event
- Phone Unlock Event
- Call State Change Event
- Line Registration Event
- Line Unregistration Event
- User Login/Logout Event

These events are XML data posted to a Web server by the phone.

You enable this feature in the **applications.cfg** configuration file. For details of how to configure these events, see Configuring Telephone Event Notification Parameters.

Viewing an Incoming Call Event

The Incoming Call Event can be used by an application to send metadata about the call to the phone in real time, or to allow the application to detect that the user of the phone is busy.

Use the following format when viewing the incoming call event:

```
<IncomingCallEvent>
    <PhoneIP> </PhoneIP>
    <MACAddress> </MACAddress>
    <CallingPartyName> </CallingPartyName>
    <CallingPartyNumber> </CallingPartyNumber>
    <CalledPartyName> </CalledPartyName>
    <CalledPartyNumber> </CalledPartyNumber>
    <TimeStamp> </TimeStamp>
</IncomingCallEvent>
```

The incoming call event contains the attributes listed in the following table.

Table 3-9: Incoming Call Event Attributes

Attribute	*Permitted Values*
Phone IP	**IP address**
IP address of the phone. For example, '172.24.128.160'.	
MACAddress	**MAC Address**
MAC address of the phone. For example, '0004f214b8e7'.	

Attribute	*Permitted Values*
CallingPartyName	**name**
The name displayed in phone's 'From' label in screen. If the line is registered and the call is initiated from that line, then the registered line display name of the calling party is shown. If the line is not registered and the call is initiated from that line, then IP address of the calling party is shown. For example, 'sip:172.24.128.160'.	
CallingPartyNumber	**number**
The number displayed on the phone. If the line is registered and the call is initiated from that line, the registered line number of the calling party is shown. If the line is not registered and the call is initiated using IP address from that line, the IP address of the calling party is shown.	
CalledPartyName	**name**
The name displayed in phone's 'To' label in screen. If the call is received by registered line, the registered line display name of the called party is shown. If the call is received on a non- registered line, the IP address of the called party is shown.	
CalledPartyNumber	**number**
The number displayed on the phone. If the call is received by registered line, the registered line number of the called party is shown. If the call is received on a non- registered line, the IP address of the called party is shown.	
TimeStamp	**time**
The date and time that the event occurred on the phone. For example, '2008-07-11T13:19:53-08:00'.	

When the telephone notification URI is set and the incoming call event is enabled to gather information, the following example shows the transmitted data for a call between two registered lines:

```
<IncomingCallEvent>
   <PhoneIP>172.24.132.135</PhoneIP>
    <MACAddress>0004f214b89e</MACAddress>
    <CallingPartyName>20701</CallingPartyName>
    <CallingPartyNumber>20701@172.18.186.94</CallingPartyNumber>
    <CalledPartyName>20300</CalledPartyName>
    <CalledPartyNumber>20300</CalledPartyNumber>
    <TimeStamp>2008-07-11T13:19:53-08:00</TimeStamp>
</IncomingCallEvent>
```

Viewing an Outgoing Call Event

The Outgoing Call Event can be used by an application to detect that the user of the phone is busy in a call.

Use the following format when viewing the outgoing call event:

```
<OutgoingCallEvent>
    <PhoneIP> </PhoneIP>
```

```
      <MACAddress> </MACAddress>
      <CallingPartyName> </CallingPartyName>
      <CallingPartyNumber> </CallingPartyNumber>
      <CalledPartyName> </CalledPartyName>
      <CalledPartyNumber> </CalledPartyNumber>
      <TimeStamp> </TimeStamp>
  </OutgoingCallEvent>
```

The outgoing call event contains the attributes listed in the following table.

Table 3-10: Outgoing Call Event Attributes

Attribute	*Permitted Values*
Phone IP	**IP address**
IP address of the phone. For example, '172.24.128.160'.	
MACAddress	**MAC Address**
MAC address of the phone. For example, '0004f214b8e7'.	
CallingPartyName	**name**
The name displayed in phone's 'From' label in screen. If the line is registered and the call is initiated from that line, then the registered line display name of the calling party is shown. For example, 'SoundPoint IP'. If the line is not registered and the call is initiated from that line, then IP address of the calling party is shown. For example, 'sip:172.24.128.160'.	
CallingPartyNumber	**number**
The number displayed on the phone. If the line is registered and the call is initiated from that line, the registered line number of the calling party is shown. If the line is not registered and the call is initiated using IP address from that line, the IP address of the calling party is shown.	
CalledPartyName	**name**
The name displayed in phone's 'To' label in screen. If the call is received by registered line, the registered line display name of the called party is shown. If the call is received on a non- registered line, the IP address of the called party is shown.	
CalledPartyNumber	**number**
The number displayed on the phone. If the call is received by registered line, the registered line number of the called party is shown. If the call is received on a non- registered line, the IP address of the called party is shown.	
TimeStamp	**time**
The date and time that the event occurred on the phone. For example, '2008-07-11T13:19:53-08:00'.	

Viewing an Offhook Event

The Offhook Event allows an application to see that the user is starting a call.

Use the following format when viewing the offhook event:

```
<OffHookEvent>
    <PhoneIP> </PhoneIP>
    <MACAddress> </MACAddress>
    <TimeStamp> </TimeStamp>
</OffHookEvent>
```

The offhook event contains the attributes listed in the following table.

Table 3-11: Offhook Event Attribute

Attribute	*Permitted Values*
Phone IP	**IP address**
IP address of the phone. For example, '172.24.128.160'.	
MACAddress	**MAC Address**
MAC address of the phone. For example, '0004f214b8e7'.	
TimeStamp	**time**
The date and time that the event occurred on the phone. For example, '2008-07-11T13:19:53-08:00'.	

Viewing an Onhook Event

The Onhook Event notifies an application that the user has ended a call. This can be used for call logging information, for example.

Use the following format when viewing the onhook event:

```
<OnHookEvent>
    <PhoneIP> </PhoneIP>
    <MACAddress> </MACAddress>
    <TimeStamp> </TimeStamp>
</OnHookEvent>
```

The onhook event contains the attributes listed in the following table.

Table 3-12: Onhook Event Attributes

Attribute	*Permitted Values*
Phone IP	**IP address**
IP address of the phone. For example, '172.24.128.160'.	
MACAddress	**MAC Address**
MAC address of the phone. For example, '0004f214b8e7'.	
TimeStamp	**time**
The date and time that the event occurred on the phone. For example, '2008-07-11T13:19:53-08:00'.	

Viewing a Phone Lock Event

The phone lock event notifies application when the phone is locked. The application should not send this instruction to the phone when it is locked as most operations are ignored in this state.

Use the following format when viewing the phone lock event:

```
<PhoneLockedEvent>
   <PhoneIP> </PhoneIP>
   <MACAddress> </MACAddress>
   <TimeStamp> </TimeStamp>
</PhoneLockedEvent>
```

The phone lock event contains the attributes listed in the following table.

Table 3-13: Phone Lock Event Attributes

Attribute	*Permitted Values*
Phone IP	**IP address**
IP address of the phone. For example, '172.24.128.160'.	
MACAddress	**MAC Address**
MAC address of the phone. For example, '0004f214b8e7'.	
TimeStamp	**time**
The date and time that the event occurred on the phone. For example, '2008-07-11T13:19:53-08:00'.	

Viewing a Phone Unlock Event

The phone unlock event notifies application when the phone is unlocked. The application should not send this instruction to the phone when it is locked as most operations are ignored in this state.

Use the following format when viewing the phone unlock event:

```
<PhoneUnlockedEvent>
   <PhoneIP> </PhoneIP>
   <MACAddress> </MACAddress>
   <TimeStamp> </TimeStamp>
</PhoneUnlockedEvent>
```

The phone lock event contains the attributes listed in the following table.

Table 3-14: Phone Unlock Event Attributes

Attribute	*Permitted Values*
Phone IP	**IP address**
IP address of the phone. For example, '172.24.128.160'.	
MACAddress	**MAC Address**
MAC address of the phone. For example, '0004f214b8e7'.	
TimeStamp	**time**
The date and time that the event occurred on the phone. For example, '2008-07-11T13:19:53-08:00'.	

Viewing a Call State Change Event

The Call State Change event notifies the application of the different call states that can exist on the phone. The application can do any call related operation on receiving these events. For example, the application can transfer an incoming call to a desired number when it receives an incoming call event.

Use the following format when viewing the call state change event:

```
<CallStateChangeEvent CallReference=" " CallState=" ">
    <PhoneIP> </PhoneIP>
    <MACAddress> </MACAddress>
    <LineNumber> </LineNumber>
    <TimeStamp> </TimeStamp>
   <CallLineInfo>
      <LineKeyNum> </LineKeyNum>
      <LineDirNum> </LineDirNum>
      <LineState> </LineState>
      <CallInfo>
```

```
            <CallState> </CallState>
            <CallType> </CallType>
            <UIAppearanceIndex> </UIAppearanceIndex>
            <CalledPartyName> </CalledPartyName>
            <CalledPartyDirNum> </CalledPartyDirNum>
            <CallingPartyName> </CallingPartyName>
            <CallingPartyDirNum> </CallingPartyDirNum>
            <CallReference> </CallReference>
            <CallDuration> </CallDuration>
         </CallInfo>
      </CallLineInfo>
   </CallStateChangeEvent>
```

The call state change event contains the attributes listed in Table the following table.

Table 3-15: Call State Change Event Attributes

Attribute	*Permitted Values*
Phone IP	**IP address**
IP address of the phone. For example, '172.24.128.160'.	
MACAddress	**MAC Address**
MAC address of the phone. For example, '0004f214b8e7'.	
TimeStamp	**time**
The date and time that the event occurred on the phone. For example, '2008-07-11T13:19:53-08:00'.	
callReference	**number**
A unique identifier for a call. By using this number, you can conference, transfer reject or hold a particular call.	
state	**Outgoing call states: Dialtone, Setup, Ringback** **Incoming call states: Offering** **Outgoing/incoming call states: Connected, Hold, Held, Free, Disconnected** **Unknown call state: Ncas**
The call state.	
LineKeyNum	**number**
Line that is registered. For example, '1'.	
LineDirNum	**phone number**
Phone number associated with line. For example, '1234'.	

Attribute	*Permitted Values*
LineState The line state.	**Active, Inactive**
CallState The call state.	**Outgoing call states: Dialtone, Setup, RingBack** **Incoming call states: Offering** **Outgoing/Incoming call states: Connected, CallConference, CallHold, CallHeld, CallConfHold, CallConfHeld** **Shared line states: CallRemoteActive**
CallType The call type.	**Incoming, Outgoing**
UIAppearanceIndex The call appearance index. The call appearance index for the active call is denoted by an asterisk (*) character suffix.	**string**
CalledPartyName If the line is registered, the value is the registered line display name. If the line is not registered, the value is the IP address of the called party.	**name**
CalledPartyDirNum If the line is registered, the value is the registered line number. If the line is not registered, the value is the IP address of the called party.	**number**
CallingPartyName If the line is registered, the value is the registered line display name. If the line is not registered, the value is the IP address of the calling party.	**name**
CallingPartyDirNum If the line is registered, the value is the registered line number. If the line is not registered, the value is the IP address of the calling party.	**number**
CallReference An internal identifier for the call.	**number**
CallDuration The duration of the call.	**number, seconds**

Viewing a Line Registration Event

The Line Registration Event fires whenever a phone registers one of its lines to a call server. This can be used for a number of purposes but is a useful event flagging the fact that the phone is up and running on the network.

Use the following format when viewing the line registration event:

```
<LineRegistrationEvent>
    <PhoneIP> </PhoneIP>
    <MACAddress </MACAddress>
    <LineNumber> </LineNumber>
    <TimeStamp> </TimeStamp>
</LineRegistrationEvent>
```

The line registration event contains the attributes listed in the following table.

Table 3-16: Line Registration Event Attributes

Attribute	*Permitted Values*
Phone IP	**IP address**
IP address of the phone. For example, '172.24.128.160'.	
MACAddress	**MAC Address**
MAC address of the phone. For example, '0004f214b8e7'.	
LineNumber	**number**
Line that is registered. For example, '1'.	
TimeStamp	**time**
The date and time that the event occurred on the phone. For example, '2008-07-11T13:19:53-08:00'.	

Viewing a Line Unregistration Event

The line unregistration event can be useful for determining when a phone is powered off or otherwise no longer available on the network. However, the event only fires if the phone is gracefully shutdown or restarted. However, if the phone experiences a power loss, the event will not be fired.

Use the following format when viewing the line unregistration event:

```
<LineUnregistrationEvent>
    <PhoneIP> </PhoneIP>
    <MACAddress> </MACAddress>
    <LineNumber> </LineNumber>
    <TimeStamp> </TimeStamp>
```

```
    </LineUnregistrationEvent>
```

The line unregistration event contains the attributes listed in the following table.

Table 3-17: Line Unregistration Event Attributes

Attribute	*Permitted Values*
Phone IP	**IP address**
IP address of the phone. For example, '172.24.128.160'.	
MACAddress	**MAC Address**
MAC address of the phone. For example, '0004f214b8e7'.	
LineNumber	**number**
Line that is registered. For example, '1'.	
TimeStamp	**time**
The date and time that the event occurred on the phone. For example, '2008-07-11T13:19:53-08:00'.	

Viewing a UserLogin/Logout Event

The UserLogin Event can be used to detect when a user signs into or out of a phone using a profile.

Use the following format when viewing the user login/logout event:

```
<UserLoginOutEvent>
    <PhoneIP> </PhoneIP>
    <MACAddress> </MACAddress>
    <CallLineInfo>
        <LineKeyNum> </LineKeyNum>
        <LineDirNum> </LineDirNum>
    </CallLineInfo>
    <UserLoggedIn> </UserLoggedIn>
    <TimeStamp> </TimeStamp>
</UserLoginOutEvent>

<UserLoginOutEvent>
    <PhoneIP> </PhoneIP>
    <MACAddress> </MACAddress>
    <CallLineInfo>
        <LineKeyNum> </LineKeyNum>
        <LineDirNum> </LineDirNum>
    </CallLineInfo>
```

```
    <UserLoggedOut/>
    <TimeStamp> </TimeStamp>
</UserLoginOutEvent>
```

The user login/logout event supports the attributes listed in the following table.

Table 3-18: User Login/Logout Event Attributes

Attribute	*Permitted Values*
Phone IP	**IP address**
IP address of the phone. For example, '172.24.128.160'.	
MACAddress	**MAC Address**
MAC address of the phone. For example, '0004f214b8e7'.	
LineKeyNum	**number**
Line that is registered. For example, '1'.	
LineDirNum	**phone number**
Phone number associated with line. For example, '1234'.	
UserLoggedIn	**name**
Name of user logged in.	
UserLoggedOut	**name**
Name of user logged out. The value is always Null.	
TimeStamp	**time**
The date and time that the event occurred on the phone. For example, '2008-07-11T13:19:53-08:00'.	

Note: How Event Values Are Generated

The LineKeyNum and LineDirNum fields are generated for each registered line on the phone. The UserLoggedIn field is generated when a user logs in. The UserLogedOut field is generated when a user logs out.

Phone State Polling

The phone can be configured to send the current state information to a specific URI or to the requestor upon receipt of an HTTP request. The following types of information can be sent:

- **Receiving Call Line Information** The line registration and call state will be sent upon receipt of an HTTP request to the call state handler (http://<Phone_IP>/polling/callstateHandler).
- **Receiving Device Information** Device- specific information will be sent upon receipt of an HTTP request to the device handler (http://<Phone_IP>/polling/deviceHandler).
- **Receiving Network Configuration** Network-specific information will be sent upon receipt of an HTTP request to the network handler (http://<Phone_IP>/polling/networkHandler).

Two HTTP transactions occur here:

- The application sends an HTTP request to a particular handler in the phone
- The Phone posts the state, in XML format, to a preconfigured Web server.

You enable this feature in the **applications.cfg** configuration file. See Configuring Phone State Polling Parameters for the remaining parameters that control this feature.

Receiving Call Line Information

The Receiving Call Line Information can be useful for providing additional information about the caller such as that available through a contact management system.

The Call Line Information message is returned in the following format:

```
<CallLineInfo>
    <LineKeyNum> </LineKeyNum>
    <LineDirNum> </LineDirNum>
    <LineState>Active</LineState>
    <CallInfo>
        <CallState> </CallState>
        <CallType> </CallType>
        <UIAppearanceIndex> </UIAppearanceIndex>
        <CalledPartyName> </CalledPartyName>
        <CalledPartyDirNum> </CalledPartyDirNum>
        <CallingPartyName> </CallingPartyName>
        <CallingPartyDirNum> </CallingPartyDirNum>
        <CallReference> </CallReference>
        <CallDuration> </CallDuration>
    </CallInfo>
</CallLineInfo>
```

Note: When the Call Info Block is Defined

The <CallInfo> block is included if and only if <LineState> is 'Active'. Otherwise it is not included.

The call line information message contains the attributes listed in the following table.

Table 3-19: Call Line Information Message Attributes

Attribute	*Permitted Values*
LineKeyNum The line that is registered. For example, '1'.	**number**
LineDirNum The phone number associated with line. For example, '1234'.	**phone number**
LineState The line state.	**Active, Inactive**
CallState The call State.	**Outgoing call states: Dialtone, Setup, Ringback** **Incoming call states: Offering** **Outgoing/incoming call states: Connected, CallConference, CallHold, CallHeld, CallConfHold, CallConfHeld** **Shared line states: CallRemoteActive**
CallType The call type.	**Incoming, Outgoing**
UIAppearanceIndex The call appearance index. The call appearance index for the active call is denoted by a * character suffix.	**string**
CallingPartyName If the line is registered, the value is the registered line display name. If the line is not registered, the value is the IP address of the calling party.	**name**
CallingPartyDirNum If the line is registered, the value is the registered line number. If the line is not registered, the value is the IP address of the calling party.	**number**
CalledPartyName If the line is registered, the value is the registered line display name. For example '45343'. If the line is not registered, the value is the IP address of the called party. For example '10.243.1.32'.	**name**
CalledPartyDirNum If the line is registered, the value is the registered line number. For example '45344'. If the line is not registered, the value is the IP address of the called party. For example '10.243.1.32'.	**number**

Attribute	*Permitted Values*
CallReference	**number**
An internal identifier for the call. By using this number, you can conference, transfer reject or hold a particular call.	
CallDuration	**number, seconds**
The duration of the call in seconds.	

Receiving Device Information

Applications can use the Device Information to do things like device firmware tracking/management as well as asset tracking.

The Device Information message is returned in the following format:

```
<DeviceInformation>
    <MACAddress> </MACAddress>
    <PhoneDN> </PhoneDN>
    <AppLoadID> </AppLoadID>
    <BootROMID> </BootROMID>
    <ModelNumber> </ModelNumber>
    <TimeStamp> </TimeStamp>
</DeviceInformation>
```

The device information message contains the attributes listed in the following table.

Table 3-20: Device Information Message Attributes

Attribute	*Permitted Values*
MACAddress	**MAC Address**
The MAC address of the phone. For example, '0004f214b8e7'.	
PhoneDN	**string**
A list of all registered lines, including expansion modules, and their directory numbers delimited by commas. For example, 'Line1:6744,Line2:4534,Line3:4534'.	
AppLoadID	**string**
The application load ID on the phone. For example, '4.0.1.18754 27-Feb-11 20:07'.	
BootROMID	**string**
The BootROM on the phone. For example, '5.0.0.11646'.	

Attribute	*Permitted Values*
ModelNumber	**string**
The phone's model number. For example, 'SoundPoint IP 650'.	
TimeStamp	**time**
The date and time that the event occurred on the phone. For example, '2008-07-11T13:19:53-08:00'.	

Receiving Network Configuration

The Network Configuration message returns the specific network information about the phone.

The Network Configuration message is returned in the following format:

```
<NetworkConfiguration>
    <DHCPServer> </DHCPServer>
    <MACAddress> </MACAddress>
    <DNSSuffix> </DNSSuffix>
    <IPAddress> </IPAddress>
    <SubnetMask> </SubnetMask>
    <ProvServer> </ProvServer>
    <DefaultRouter> </DefaultRouter>
    <DNSServer1> </DNSServer1>
    <DNSServer2> </DNSServer2>
    <VLANID> </VLANID>
    <DHCPEnabled> </DHCPEnabled>
</NetworkConfiguration>
```

The network configuration message contains the attributes listed in the following table.

Table 3-21: Network Configuration Message Attributes

Attribute	*Permitted Values*
DHCPServer	**IP address**
The DHCP server IP address. For example, '192.168.1.1'.	
MACAddress	**MAC Address**
The MAC address of the phone. For example, '0004f214b8e7'.	
DNSSuffix	**host name**
The DNS domain suffix. For example 'polycom.com'.	

Attribute	*Permitted Values*
IPAddress	**IP address**
The IP address of the phone. For example '192.168.1.5'.	
SubnetMask	**IP address**
The subnet mask: For example '255.255.255.0'.	
ProvServer	**IP address**
The IP address of the provisioning server or a host name. For example '192.168.1.10'.	
DefaultRouter	**IP address**
The IP address of the default router (or IP gateway). For example '192.168.1.1'.	
DNSServer1	**IP address**
The configured IP address of DNS Server 1. For example '192.168.1.250'.	
DNSServer2	**IP address**
The configured IP address of DNS Server 2. For example '192.168.1.250'.	
VLANID	**Null, 0 to 4094**
The phone's 802.1Q VLAN identifier. For example '45'.	
DHCPEnabled	**Yes, No**
If DHCP is enabled, set to 'Yes'.	

Part II: Creating Your Application

Part II gives you an overview of the Polycom phones and of the Polycom UC Software and consists of the following chapters:

- Chapter 4: Writing Your Web Application
- Chapter 5: Using Relevant UCS Configuration Parameters

Chapter 4: Writing Your Web Application

This chapter provides information you might require to write your web application.

The topics in this chapter include:

- Developing Your Browser Application
- Developing Microbrowser-Specific Application

Web Info: Polycom Developer Community

Polycom has an active Developer Community Forum where you can find more sample code as well as answers to many common developer questions.

Developing Your Browser Application

You want to develop a Web application that can be run on the Browser available on certain VVX® phones and SpectraLink® 8400 Series wireless handsets.

This section contains information on:

- Supported Platforms
- Supported Standards
- HTTP Support
- Launching the Browser from the Phone.
- Navigation and Form Editing on the Main Browser
- Viewing the Idle Browser
- Using Browser JavaScript DOM Extensions
- Sample Browser Web Applications

Supported Platforms

The following Polycom phones support the use of a Browser:

- VVX 500
- VVX 1500 (When the phone is running SIP 3.1.3 or later)
- SpectraLink 8400 Series Wireless Handsets

Supported Standards

The Browser supports true Web 2.0 applications—indistinguishable from a desktop application, provides immediate feedback and updates information without a deliberate refresh—with the following features:

- XHTML 1.1. (XHTML 1.0 is supported but not recommended.)
- HTML 4.01 with partial support for HTML 5. No support for HTML5 Audio or Video except on VVX500s.
- CCS 2.1 with partial support for CCS 3.0. No support for the new white-space values pre-wrap and pre-line.
- SVG 1.1 (partial support)
- JavaScript. Supports ECMA-262 with extensions.
- XMLHttpRequest
- DOM
- HTTP 1.1

HTTP Support

The Browser is a fully compliant HTTP/1.1 user agent as described in RFC 2616. For more information, see http://www.ietf.org/rfc/rfc2616.txt?number=2616.

The Browser supports:

- **Cookies** Cookies are stored in the flash file system; they are preserved when the phone reboots or is reconfigured. Cookies are shared between the idle display Browser, if available, and the main Browser.
- Refresh headers
- HTTP proxies
- **HTTP proxy authentication** The phone's login credentials or the user's name and password can be used to authenticate the user with the server.
- **HTTPS by HTTP over TLS** The Browser will support the TLS protocol v1 only. It is not backward compatible with SSL v2 or SSL v3.
- Custom CA certificates

There are the following exceptions:

- The SpectraLink 8400 Series wireless handsets do not support pop-up windows in the Browser.

Web Info: To View Trusted Certificate Authorities

For more information on CA certificates, see *Technical Bulletin 17877: Using Custom Certificates With SoundPoint IP Phones*.

Launching the Browser from the Phone

You launch the browser on the VVX phones differently from the SpectraLink 8400 Series wireless handsets.

From the VVX 500 and 1500 Phones

By default, the main Browser loads the home page, specified in the `mb.main.home` configuration parameter, once the user presses the **App** key on the VVX 1500 phone or selects the **Applications** icon on the Home screen on the VVX 500 phone. Subsequent presses of the **App** key or the **Applications** icon toggle between the Browser and phone applications. The Browser title bar displays a progress indicator when the page is loading.

While the user is viewing the Browser, if there is an event in the phone application that requires the user's attention, the phone application displays automatically in the foreground. The user can return to the Browser by pressing the **App** key or selecting the **Applications** icon. Even though the user cannot see the Browser application, it is still active and pending transactions will occur in the background and be immediately visible when the Browser is brought to the foreground. Examples of the main Browser on VVX phones are shown in Figures 4-1 and 4-2. The main Browser on the VVX 500 and VVX 1500 phones runs in full screen mode only.

Figure 4-1: VVX 1500 Main Browser

Figure 4-2: VVX 500 Main Browser

From the SpectraLink 8400 Series Wireless Handsets

By default, when you select **Applications** from the Home screen on a SpectraLink 8400 Series handset, the list of applications displays: up to 13 Web applications displays, plus up to 13 legacy Open Application Interface (OAI) applications. When the user selects a web application from the list, the browser displays and the browser title bar shows a progress indicator when the page is loading.

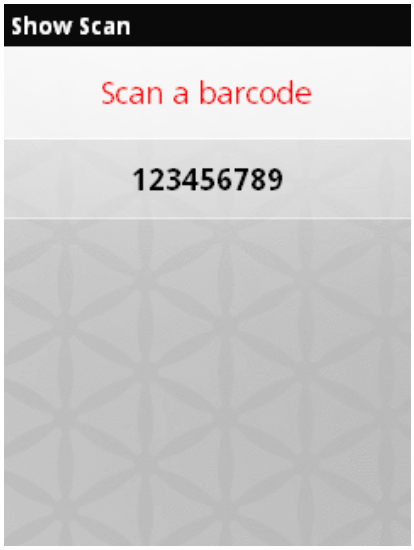
While the user is viewing the Browser, if there is an event in the phone application that requires the user's attention, the phone application displays automatically in the foreground. The user can return to the Browser by selecting an application from the Applications list or, if the browser session was placed on hold, it can be resumed from the session list. Even though the user cannot see a held Browser application, it is still active and pending transactions will complete in the background and be immediately visible when the Browser is brought to the foreground.

Note: Browser Display is Not Always Interrupted By Phone's Operation

Not all events require the user's attention to the display, for example, Push-To-Talk audio traffic plays out the rear speaker without interrupting the Browser display.

An example of the main Browser on the SpectraLink 8400 Series handsets is shown in Figure 4-3. This example does not have soft keys displayed. For the source code for this application (minus the background image), see Sample Browser Web Applications.

Figure 4-3: SpectraLink 8400 Series Main Browser



Navigation and Form Editing on the Main Browser

Navigation and Form Editing is slightly different on each phone because of the different keyboard keys and the presence or absence of a touch-screen display. However, in a general sense the user navigates in the Browser as they would in any major Web browser.

Note: Error Indications in the Browser

Network-related errors, such as HTTP 404, will be handled in the page body as in any major web browser. JavaScript errors will be indicated by an icon in the title bar, but not accompanied by any text messages.

From the VVX 1500 Phones

The navigation keys on the VVX 1500 handsets are used to scroll the Web page up, down, left, and right. There is an on-screen navigation cluster that performs in the same manner. The toolbar shows the following buttons (see Figures 4-1 and 4-2):

- Home
- Stop/Refresh (depending on whether the page has completely downloaded yet)
- Keyboard pop-up (when focus is on an input widget)
- Navigation (Up, down, left, and right buttons appear only if scrolling is available in those directions)

  Holding down the navigation keys on the VVX 1500 phone and the SpectraLink 8400 Series handsets speeds up scrolling.

- Exit
- Encoding (Ascii, Cyrillic, Katakana, Latin, and Unicode)
- Text entry mode (123, ABC, abc, and Abc)

Form editing in the Browser behaves as in any major Web browser. When the focus is on an input field and the keyboard is invoked such that the input field is vertically centered in the top portion of the screen, the keyboard widget displays in the lower portion of the screen. The keyboard is removed from the screen once the user 'clicks' on the screen. This enables the user to click the Submit button next to the entry field without closing the keyboard widget.

From the VVX 500 Phones

The user swipes the VVX 500 screen to scroll the web page up, down, left, and right. The toolbar shows the following buttons:

- Home
- Stop/Refresh (depending on whether the page has completely downloaded yet)
- Keyboard pop-up (when focus is on an input widget)
- Exit
- Encoding (Ascii, Cyrillic, Katakana, Latin, and Unicode)
- Text entry mode (123, ABC, abc, and Abc)

Form editing in the Browser behaves as in any major Web browser. When the focus is on an input field and the keyboard is invoked such that the input field is vertically centered in the top portion of the screen, the keyboard widget displays in the lower portion of the screen. The keyboard is removed from the screen once the user 'clicks' on the screen. This enables users to click the Submit button next to the entry field without closing the keyboard widget.

From the SpectraLink 8400 Series Handsets

On the SpectraLink 8400 Series handsets, the Up and Down navigation buttons scroll the web page up and down, and the Left and Right navigation keys move the selection highlight between selectable links, buttons and input fields. The OK button selects a link or button. Default soft keys in the Browser allow the user to go the Home screen, refresh the current page, go back one page, or quit the Browser.

When editing a field, the soft keys change to << (backspace), Mode (character entry mode), Back (go back one page), or cancel editing mode. In Editing mode, the Left and Right navigation keys enable you to move within the entered text or move you to the previous/next link or input box if you are at the beginning/end of the entered text. The Up/Down navigation buttons continue to scroll the page up and down.

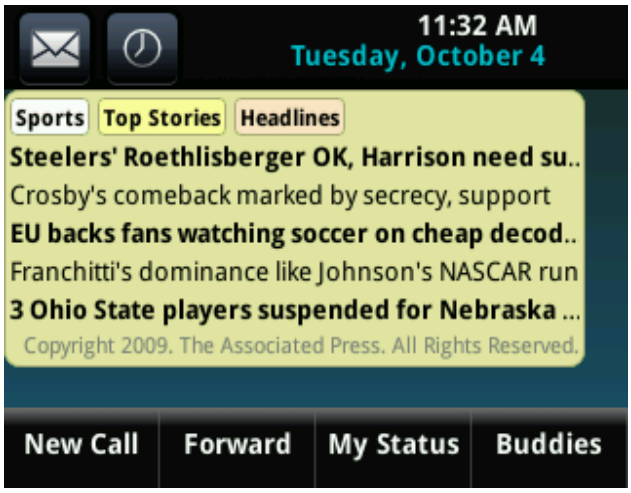
Viewing the Idle Browser

The idle display browser functions independently of the main Browser, but is capable of rendering the same content. Its home page is configured via the `mb.idleDisplay.home` configuration parameter. The idle display browser does not accept any user input and will only appear when the user has no phone calls in progress and the phone is in the idle user interface state.

Examples of the Idle Browser on different VVX phones are shown in Figure 4-4 and 4-5. The Idle Browser is not supported on the SpectraLink 8400 Series handsets.

Figure 4-4: VVX 1500 Idle Browser

Figure 4-5: VVX 500 Idle Browser



Using Browser JavaScript DOM Extensions

The Browser provides access to phone-specific Document Object Model (DOM) JavaScript extensions. The DOM is created by the browser after parsing an XHTML file. JavaScript's primary role in the browser is to modify properties of the DOM. The DOM is a collection of every object defined in the XHTML, for example, every button, every label, and every image. A web application can use JavaScript to modify DOM properties just like any other XHTML object.

For more JavaScript examples, see JavaScript Examples for the Browser.

This section provides information on the following custom DOM extensions:

- PolySoftKey
- PolyURI
- PolyBarCode

PolySoftKey

The PolySoftKey DOM object provides control over the soft keys in the Browser. You can use it to hide or show the default or custom defined soft keys and to respond to soft key presses performed by the user.

The JavaScript PolySoftKey.* custom DOM extensions are as follows:

- **PolySoftKey.customSoftkeyEvent.connect({function})** Connects the JavaScript function supplied to the callback that is made when a custom soft key was pressed (refer to the example below)
- **PolySoftKey.setSoftkeyLabel(int, string)** Used to set the label of a given custom soft key (0 to 3)
- **PolySoftKey.hideToolbar()** Allows the application to hide the soft key toolbar
- **PolySoftKey.showToolbar()** Brings back the soft key toolbar
- **PolySoftKey.getSoftkeyPoint(int)** Returns a JavaScriptON object with the X, Y coordinates of the soft key. When used in combination with hideToolBar(), you can replace hard key button events with any type of HTML object.
- **PolySoftKey.resetAllDefaults()** Clears all custom defined key labels
- **PolySoftKey.resetDefaultKey(int)** Clears custom key label (0 to 3)

The PolySoftKey custom DOM extension example is shown next.

Sample Code 4-1: PolySoftKey DOM Extension

```
PolySoftKey.customSoftkeyEvent.connect(skCallBack);

PolySoftKey.setSoftkeyLabel(0, "one");
PolySoftKey.setSoftkeyLabel(1, "Two");
PolySoftKey.setSoftkeyLabel(2, "Three");
PolySoftKey.setSoftkeyLabel(3, "Four");
```

```
function skCallBack(key, skEvent){
   switch(key){
   case 0:
      document.getElementById("eventStuff").innerHTML = "SK 1 was pressed";
      break;
   case 1:
      document.getElementById("eventStuff").innerHTML = "SK 2 was pressed";
      break;
   case 2:
      document.getElementById("eventStuff").innerHTML = "SK 3 was pressed";
      break;
   case 3:
      document.getElementById("eventStuff").innerHTML = "SK 4 was pressed";
      break;
   }
   document.getElementById("eventValue").innerHTML = skEvent;
}

// hide the tool bar
function hideSKs(){
   PolySoftKey.hideToolBar();
}

// show the tool bar
function showSKs(){
   PolySoftKey.showToolBar();
}

// get the styled points of the SKs so app can add whatever object they
want to that area
// after calling hideToolBar()
function getSKPoints(){
   // Returns a JSON object with two properties, X & Y.  To convert to JS
object you must
   // use the eval function on the JSON object.
   var one = PolySoftKey.getSoftkeyPoint(0);
   var oneObj = eval('(' + one + ')'); //to help avoid syntax errors, wrap
with '(' ')' chars

   var two = PolySoftKey.getSoftkeyPoint(1);
   var twoObj = eval('(' + two + ')');

   var three = PolySoftKey.getSoftkeyPoint(2);
```

```
    var threeObj = eval('(' + three + ')');

    var four = PolySoftKey.getSoftkeyPoint(3);
    var fourObj = eval('(' + four + ')');

    document.getElementById("points").innerHTML = oneObj.X + ":" + oneObj.Y
+ "," + twoObj.X + ":" + twoObj.Y + "," + threeObj.X + ":" + threeObj.Y +
"," + fourObj.X + ":" + fourObj.Y;
}
```

PolyURI

The PolyURI custom DOM extension gives you a few general controls/notifications such as notification when the Browser is hidden or shown, as opposed to other applications on the phone. It also allows you to push a URI (see Telephone Integration URIs) back to the phone—in a sort of loopback fashion—from a loaded Web page.

The JavaScript PolyURI.* custom DOM extensions are as follows:

- **PolyURI.pushUri(string)** Enables you to push any Polycom internal URI. For example, Play:: and Tel::)
- **PolyURI.shownSig.connect({function})** Connects the JavaScript function supplied to the callback that is made when the Browser is visible to the user (for example, after being resumed from the call appearance list)
- **PolyURI.hiddenSig.connect({function})** Connects the JavaScript function supplied to the callback that is made when the Browser is not visible to the user (for example, when put on hold in the call appearance list)

The PolyURI custom DOM extension example is shown next.

Sample Code 4-2: PolyUri DOM Extension

```
PolyUri.shownSig.connect(appShown);
PolyUri.hiddenSig.connect(appHidden);

function appShown(){
   // Pushes a play request whenever the browser is shown
  PolyUri.pushUri("play:http://123.45.67.890:8080/sdk/demos/sounds/DingLin
g.wav");
}
function appHidden(){
}
```

PolyBarCode

The PolyBarCode custom DOM extension gives you control/access to the SpectraLink 8400 Series wireless handsets barcode reader functionality.

The JavaScript PolyBarCode.* custom DOM extensions are as follows:

- **PolyBarCode.getLastBarCode()** Returns the last scanned bar code
- **PolyBarCode.enableDefaultInsert()** Tells the Browser to insert new bar code data into a text field if one is currently in focus on the screen
- **PolyBarCode.disableDefaultInsert()** Disables inserting new bar code data into text fields
- **PolyBarCode.newDataSig.connect({function})** Connects the JavaScript function supplied to the callback that is made when new data is present, can be hooked up to a JavaScript method (refer to the example below)

The PolyBarCode custom DOM extension example is shown next.

Sample Code 4-3: PolyBarCode DOM Extension

```
//Registers a JavaScript function to be executed upon new barcode data
PolyBarCode.newDataSig.connect(bcCallBack);

//Optional calls, default insert is enable by default
PolyBarCode.enableDefaultInsert();
//PolyBarCode.disableDefaultInsert();
function bcCallBack(data){
   value = data
}

function foo(){
   value = PolyBarCode.getLastBarCode()
}
```

Sample Browser Web Applications

This section presents a sample application, in attachment **mip3.zip**, that you can use as a starting point for writing your own web application. Additional applications can be found in attachment **app_examples.zip**.

Power Tip: Access to Sample Application Attachments

Polycom recommends that you use Adobe Reader 8 or 9 to view this guide and the attachments. Click on the paperclip icon on the left-hand side to view the attachment **mip3.zip** and **app_examples.zip**.

Sample Code 4-4, shown next, is a simple web application that displays the barcode information scanned by the barcode reader on a SpectraLink 8450 handset. The code uses JavaScript to register with the JavaScript Barcode Read callback. When the callback happens, the application takes that information and creates a <li> with the barcode information in the unordered list.

Sample Code 4-4: Barcode Read Callback

```
<html>
  <head>
    <title>Show Barcode Data</title>
    <style>
    *{padding: 0; margin: 0;  }

    #scanlist li{ padding: 5px; font-size: large; font-weight: normal;
  display: block; height: 2em;  line-height: 2em; border-bottom: 1px;
  border-top: 1px;   opacity: 1;  -webkit-transition: opacity .2s linear; }


    body{  font-family: sans-serif; }

    #scanlist{  margin-top: -20px;}

    #scans{ clear: both; }

    #scanlist li:first-child{font-weight: bold;   }

    #head{ font-size: large;  height: 3em;  line-height: 3em; background-
color: rgba(255,255,255,.7);  color: rgb(255,0,0); border-bottom: 1px solid
rgba(255,255,255,.5);  }

        form{ margin: 15px 0px;  visibility: invisible; opacity: 0; height:
0;}

    </style>
    <script type="text/javascript">
      PolySoftKey.hideToolBar();
      PolyBarCode.newDataSig.connect(add_input);
```

```
        function add_input(barcode){
          var tparent = document.getElementById('scanlist');
          var li = document.createElement("li");
          tparent.removeChild(tparent.lastChild);
          li.innerHTML = barcode;
          li.setAttribute("align", "center");
          tparent.insertBefore(li, tparent.firstChild);
        }
      </script>
    </head>
    <body>

      <div id="head">
      <center>Scan a barcode</center>
      </div><br/>
      <div id="scans">
        <ul id="scanlist">

        </ul>
      </div>
    </body>
  </html>
```

Developing Microbrowser-Specific Applications

You want to develop a Web application that can be run on the Microbrowser available on certain SoundPoint® IP and SoundStation® IP phones.

This section contains information on:

- Supported Platforms
- Supported XHTML Elements
- HTTP Support
- Launching the Microbrowser From the Phone
- Navigation and Form Editing Behavior on the Main Browser
- Viewing the Idle Browser
- Sample Microbrowser Web Applications

Supported Platforms

The following Polycom phones support the use of a Microbrowser:

- SoundPoint IP 321/331/335, IP 450, IP 550, IP 560, IP 650, IP 670 desktop phones
- SoundStation IP 5000, IP 6000, IP 7000
- SoundStation Duo (In SIP mode only)
- VVX 1500 (When the phone is running SIP 3.1.3 or earlier)

Supported XHTML Elements

The Microbrowser supports a subset of XHTML elements. Most are derived from HTML 4.01.

The supported elements and attributes are:

- Basic Tags
- Link Tags
- Input Tags
- Image Tags
- Table Tags
- Meta Information Tags

Unsupported elements and attributes are described in Unsupported XHTML elements on the Microbrowser.

Basic Tags

The following basic tags are supported:

- *<!DOCTYPE>*—Defines the document type
- <!--...-->—Defines a comment

<!DOCTYPE>

The <!DOCTYPE> declaration should be the very first thing in your document, before the <html> tag. This tag tells the browser which XHTML specification the document uses. XHTML 1.0 specifies three XML document types: Strict, Transitional, and Frameset.

XHTML Strict

Use this DTD when you want clean markup, free of presentational clutter.

For example, <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

XHTML Transitional

Use this DTD when you need to use XHTML's presentational features.

For example, <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">

XHTML Frameset

Use this DTD when you want to use frames.

For example, <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Frameset//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-frameset.dtd">

XHTML 1.1 specifies one XML document type: Strict. For example, <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.1//EN" "http://www.w3.org/TR/xhtml11/DTD/xhtml11.dtd">

This tag does not have any attributes.

<!--...-->

The comment tag is used to insert a comment in the source code. A comment will be ignored by the browser. You can use comments to explain your code, which can help you when you edit the source code at a later date.

This tag does not have any attributes.

Link Tags

The following link tag is supported:

- *<a>*—Defines an anchor

<a>

The <*a*> tag defines an anchor. An anchor can be used to create a link to another document by using the href attribute or to create a bookmark inside a document, by using the name or id attribute.

The <*a*> tag supports the attributes listed in the table shown next.

Table 4-1: <*a*> Tag Attributes

Attribute	*Value(s)*
href[1]	**URL**
The target URL of the link. For example, 'http://www.polycom.com'.	
name[2]	**section_name**
Names an anchor. Use this attribute to create a bookmark in a document.	

[1] The Microbrowser supports both http:// and tel:// URL schemes as well as internal URIs. When a tel:// URL is selected, the phone switches to the telephony application and dials the number specified in the URL. Currently the number is dialed as-is, however, full support for tel:// URL parsing as specified in RFC 2806 will be available in a future release. sip:// URLs are not supported at this time.

[2] This attribute is parsed, but not used.

An example of the <*a*> tag is shown next.

```
<a href=" http://www.polycom.com" name="link1" />Link to Polycom</a>
```

Input Tags

The following input tags are supported:

- *<form>*—Defines a form
- *<input>*—Defines an input field

Note: Nesting Forms Are Supported

The Microbrowser supports both the GET and POST methods for submitting forms. Nesting forms within tables is supported. However, nesting of one form tag within another is not supported and may lead to unexpected results.

<form>

The <*form*> tag creates a form for user input. A form can contain text fields, check boxes, radio buttons and more. Forms are used to pass user data to a specified URL.

The <*form*> tag supports the attributes listed in the table shown next.

Table 4-2: *<form>* Tag Attributes

Attribute	*Value(s)*
action	**URL**
A URL that defines where to send the data when the submit button is pushed. For example, 'http://www.google.com'.	
method[1]	**get, post**
The HTTP method for sending data to the action URL. The default is **get**. • method=**get**: This method sends the form contents in the URL: URL?name=value&name=value. • method=**post**: This method sends the form contents in the body of the request.	
name	**form_name**
Defines a unique name for the form.	

[1] If the form values contains non-ASCII characters or exceeds 100 characters, you must use method=**post**.

An example for the <*form*> tag is shown next.

```
<form name="appForm" method="get" >
  Input elements …..
</form>
```

<input>

The <*input*> tag defines the start of an input field where the user can enter data. In XHTML the <input> tag must be properly closed.

The <*input*> tag supports the attributes listed in the table shown next.

Table 4-3: *<input>* Tag Attributes

Attribute	*Value(s)*
checked[1]	**checked**
Indicates that the input element should be checked when it first loads.	
name[2]	**field_name**
Defines a unique name for the input element.	
type	**checkbox, file, hidden, password, radio, reset, submit, text**
Indicates the type of the input element. The default value is **text**.	
value[3][4]	**value**
For buttons, reset buttons and submit buttons: Defines the text on the button. For image buttons: Defines the symbolic result of the field passed to a script. For checkboxes and radio buttons: Defines the result of the input element when clicked. The result is sent to the form's action URL. For hidden, password, and text fields: Defines the default value of the element.	

[1] Used with type=**checkbox** and type=**radio**

[2] This attribute is required with type=**button**, type=**checkbox**, type=**file**, type=**hidden**, type=**image**, type=**password**, type=**text**, and type=**radio**

[3] Cannot be used with type=**file**

[4] This attribute is required with type=**checkbox** and type=**radio**

Image Tags

The following image tag is supported:

- *<img>*—Defines an image

The Microbrowser supports images stored in uncompressed `.bmp` or in `.jpg` format.

- While all BMP bit depths will be displayed to the best of the phone's ability, Polycom recommends that the image format most suitable for the target platform be chosen. For example:
  - The SoundPoint IP 601 LCD supports four levels of grey, so a 16-color BMP format would be most appropriate.
  - The SoundPoint IP 670 LCD supports 12-bit color.
- JPEG images are supported on SoundPoint IP / SoundStation IP phones except for SoundPoint IP 321/331/335, 450, 550, 560, 650, and 670 desktop phones, SoundStation IP 5000, 6000, and 7000 conference phones, SoundStation Duo conference phones.

Images can be scrolled up and down; however images that are too wide will be truncated.

Various platforms have differing limits due to memory. There are also differing pixel limits for devices of differing pixel depth. A 1 bit per pixel image 160x80 requires only 1600 bytes. For a 24-bit picture, the memory requirement is 38400 bytes.

There are several limits depending on the source data (this involves the cache limits in configuration) and the display converted data, which is dependent on available RAM (and is limited in the code depending on platform).

<img>

The <*img*> tag defines an image.

Note: Certain Image Elements Are Not Support in XHTML 1.0

The `align`, `border`, `hspace`, and `vspace` attributes of the image element are not supported in XHTML 1.0 Strict DTD. The image is not scaled—up or down—when only one of **width** or **height** is used; however, scaling works when both are used together.

The <*img*> tag supports the attributes listed in the table shown next.

Table 4-4: <*img*> Tag Attributes

Attribute	*Value(s)*
src	**URL**
The URL of the image to display. For example, 'http://www.topxml.com/images/topxml_site.gif'.	
height	**pixels or %**
Specifies the height of the image in pixel or percent. For example, '30'.	

Attribute	*Value(s)*
width	**pixels or %**
Specifies the width of the image in pixel or percent. For example, '30'.	

An example for the <*img*> tag is shown next.

```
<img src=" http://www.topxml.com/images/topxml_site.gif" height="30px"
width="10%" />
```

Table Tags

The following table tags are supported:

- <table>—Defines a table
- <caption>—Defines a table caption
- <th>—Defines a table header
- <tr>—Defines a table row
- <td>—Defines a table cell
- <thead>—Defines a table header
- <tbody>—Defines a table body
- <tfoot>—Defines a table footer

Note: XHTMLTable Must be Correctly Formatting For Proper Phone Display

XHTML tables must be properly formatted or they will not display properly on the phone. Formatting must include <*tbody*> and <*/tbody*> tags.

<table>

The <*table*> tag defines a table. Inside a <table> tag you can put table headers, table rows, table cells, and other tables. The `align` and `bgcolor` attributes of the table element are not supported in XHTML 1.0 Strict DTD.

The <*table*> tag supports the attributes listed in the table shown next.

Table 4-5: <*table*> Tag Attributes

Attribute	*Value(s)*
align Aligns the table. Deprecated. Use **styles** instead.	**left, center, right**
border Specifies the border width. Set **border**=0 to display tables with no borders.	**pixels**
cellpadding Specifies the space between the call walls and the contents.	**pixels or %**
cellspacing Specifies the space between the cells.	**pixels or %**
width Specifies the width of the table.	**pixels or %**

An example for the <*table*> tag is shown next.

```
<table align="center" border="1px" cellpadding="1px" cellspacing="1px"
width="100%" />
```

<caption>

This element defines a table caption. The <*caption*> tag must be inserted immediately after the <*table*> tag. You can specify only one caption per table. Usually the caption will be centered above the table. The `align` attribute of the caption element is not supported in XHTML 1.0 Strict DTD.

The <*caption*> tag supports the attributes listed in the table shown next.

Table 4-6: <*caption*> Tag Attributes

Attribute	*Value(s)*
align Aligns the caption. Deprecated. Use **styles** instead.	**left, right, top, bottom**
id Defines a unique name for the map tag.	**unique_name**
class The class of the element.	**class_rule, style_rule**

Attribute	*Value(s)*
title	**tooltip_text**
Text to display in a tool tip.	
style	**style_definition**
An inline style definition.	
dir	**ltr (left to right), rtl (right to left)**
Sets the text direction.	
lang	**language_code**
Sets the language. For example, EN=English, DE=German.	
xml:lang	**language_code**
Sets the language. For example, EN=English, DE=German.	

<th>

This tag defines a table header cell in a table. The text within the <*th*> element usually renders in bold. The `bgcolor`, `height`, `width`, and `nowrap` attributes of the <*th*> element are not supported in XHTML 1.0 Strict DTD.

The <*th*> tag supports the attributes listed in the table shown next.

Table 4-7: <*th*> Tag Attributes

Attribute	*Value(s)*
abbr	**abbr_text**
Specifies an abbreviated version of the content in a cell.	
align	**left, right, center, justify, char**
Specifies the horizontal alignment of cell content text.	
axis	**category_name**
Defines a name for a cell.	
bgcolor	**rgb(x,x,x), #xxxxxx, colorname**
Specifies the background color of the table cell. Deprecated. Use **styles** instead.	
char	**character**
Specifies which character to align text on. Used if **align**=char.	

Attribute	*Value(s)*
charoff	**pixels, %**
Specifies the alignment offset to the first character to align on. Used if **align**=char.	
class	**class_rule, style_rule**
The class of the element.	
colspan	**number**
Indicates the number of columns this cell should span.	
dir	**ltr (left to right), rtl (right to left)**
Sets the text direction.	
headers	**header_cells_id**
A space-separated list of cell IDs that supply header information for the cell. This attribute allows text-only browsers to render the header information for a given cell.	
height	**pixels**
Specifies the height of the table cell. Deprecated. Use **styles** instead.	
id	**unique_name**
Defines a unique name for the map tag.	
lang	**language_code**
Sets the language. For example, EN=English, DE=German.	
nowrap	**nowrap**
Whether to disable or enable automatic text wrapping in this cell. Deprecated. Use **styles** instead.	
rowspan	**number**
Indicates the number of rows this cell should span.	
title	**tooltip_text**
Text to display in a tool tip.	
scope	**col, colgroup, row, rowgroup**
Specifies if this cell provides header information for the rest of the row that contains it (row), or for the rest of the column (col), or for the rest of the row group that contains it (rowgroup), or for the rest of the column group that contains it.	
style	**style_definition**
An inline style definition.	

Attribute	*Value(s)*
valign	**top, middle, bottom, baseline**
Specifies the vertical alignment of the cell content.	
width	**pixels, %**
Specifies the width of the table cell in pixels or a percentage. Deprecated. Use **styles** instead.	
xml:lang	**language_code**
Sets the language. For example, EN=English, DE=German.	

<tr>

This tag defines a row in a table. The `bgcolor` attribute of the <*tr*> element are not supported in XHTML 1.0 Strict DTD.

The <*tr*> tag supports the attributes listed in the table shown next.

Table 4-8: <*tr*> Tag Attributes

Attribute	*Value(s)*
align	**left, right, center, justify, char**
Specifies the horizontal alignment of cell content text.	

<td>

This tag defines a cell in a table. The `bgcolor`, `height`, `width`, and `nowrap` attributes of the td element are not supported in XHTML 1.0 Strict DTD.

The <*td*> tag supports the attributes listed in the table shown next.

Table 4-9: <*td*> Tag Attributes

Attribute	*Value(s)*
align	**left, right, center, justify, char**
Specifies the horizontal alignment of cell content text.	
colspan	**number**
Indicates the number of columns this cell should span.	

Attribute	*Value(s)*
rowspan	**number**
Indicates the number of rows this cell should span.	

<thead>

This tag defines a table header. The< *thead*>, <*tfoot*> and <*tbody*>tags enable you to group rows in a table. When you create a table, you might want to have a header row, some rows with data, and a row with totals at bottom. This division enables browsers to support scrolling of table bodies independently of the table header and footer. When long tables are printed, the table header and footer information may be repeated on each page that contains table data.

Note: Table Tag Order Must Be Followed

The <*thead*> tag must have a <*tr*> tag inside. If you use the <*thead*>, <*tfoot*> and <*tbody*> tags, you must use every element. They should appear in this order: <*thead*>, <*tfoot*> and <*tbody*>, so that browsers can render the footer before receiving all the data. You must use these tags within the table element.

The <*thead*> tag supports the attributes listed in the table shown next.

Table 4-10: <*thead*> Tag Attributes

Attribute	*Value(s)*
align	**left, right, center, justify, char**
Specifies the horizontal alignment of cell content text.	
char	**character**
Specifies which character to align text on. Used if **align**=char.	
charoff	**pixels, %**
Specifies the alignment offset to the first character to align on. Used if **align**=char.	
class	**class_rule, style_rule**
The class of the element.	
dir	**ltr (left to right), rtl (right to left)**
Sets the text direction.	

Attribute	*Value(s)*
id Defines a unique name for the map tag.	**unique_name**
lang Sets the language. For example, EN=English, DE=German.	**language_code**
title Text to display in a tool tip.	**tooltip_text**
style An inline style definition.	**style_definition**
valign Specifies the vertical alignment of the cell content.	**top, middle, bottom, baseline**
xml:lang Sets the language. For example, EN=English, DE=German.	**language_code**

<tbody>

This tag defines a table body. The <*thead*>, <*tfoot*> and <*tbody*> tags enable you to group rows in a table.

The <*tbody*> tag supports the attributes listed in the table shown next.

Table 4-11: <*tbody*> Tag Attributes

Attribute	*Value(s)*
align Specifies the horizontal alignment of cell content text.	**left, right, center**

<tfoot>

This tag defines a table footer. The <*thead*>, <*tfoot*> and <*tbody*> tags enable you to group rows in a table.

The <*tfoot*> tag supports the attributes listed in the table shown next.

Table 4-12: <*tfoot*> Tag Attributes

Attribute	*Value(s)*
align Specifies the horizontal alignment of cell content text.	**left, right, center, justify, char**
char Specifies which character to align text on. Used if **align**=char.	**character**
charoff Specifies the alignment offset to the first character to align on. Used if **align**=char.	**pixels, %**
class The class of the element.	**class_rule, style_rule**
dir Sets the text direction.	**ltr (left to right), rtl (right to left)**
id Defines a unique name for the map tag.	**unique_name**
lang Sets the language. For example, EN=English, DE=German.	**language_code**
title Text to display in a tool tip.	**tooltip_text**
style An inline style definition.	**style_definition**
valign Specifies the vertical alignment of the cell content.	**top, middle, bottom, baseline**
xml:lang Sets the language. For example, EN=English, DE=German.	**language_code**

Meta Information Tags

The following meta information tags are supported:

- *<head>*—Defines information about the document

<head>

The head element can contain information about the document. The browser does not display the "head information" to the user. The following tags can be in the head section: <*base*>, <*link*>, <*meta*>, <*script*>, <*style*>, and <*title*>.

No attributes are supported.

Note: No Title Bar in Microbrowser

Due to space constraints, there isn't a static title bar at the top of the Microbrowser window, as there is in most other browsers. The title is displayed in large bold text in the first line of the page, and is scrolled off the screen as the focus is moved down the page.

HTTP Support

The Microbrowser is a fully compliant HTTP/1.1 user agent:

The Microbrowser supports:

- Cookies
- Refresh headers
- HTTP proxies
- HTTPS over SSL/TLS
- Custom CA certificates

There are the following exceptions:

- There is no sophisticated caching. The HTML cache refresh META tag is not supported.
- Any images in the body of a document with the same URL are assumed to be the same image. The image is loaded from the Microbrowser's memory instead of making another request to the server.
- When a new page is requested, the Microbrowser's internal memory is cleared and all components of the new page are downloaded from the server.

Web Info: To View Trusted Certificate Authorities

For more information on CA certificates, see *Technical Bulletin 17877: Using Custom Certificates With SoundPoint IP Phones*.

Launching the Microbrowser From the Phone

The first time the **Applications** key is pressed, the main Microbrowser loads the home page specified in the `mb.main.home` configuration parameter. Subsequent presses of the **Applications** key simply toggle

between the Microbrowser and phone applications. The active page remains loaded in memory when you toggle.

Whenever there is an event in the phone application that requires the user's attention, the telephony application is brought to the foreground automatically.

While the user is viewing the Microbrowser, if there is an event in the phone application that requires the user's attention, the phone application displays automatically in the foreground. The user can return to the Microbrowser by pressing the **Applications** key. Even though the user cannot see the Microbrowser application, it is still active and pending transactions will complete in the background and be immediately visible when the Browser is brought to the foreground.

Examples of the main Microbrowser on SoundPoint IP 450 and 670 are shown in Figures 4-6 and 4-7.

Figure 4-6: SoundPoint IP 670 Main Browser

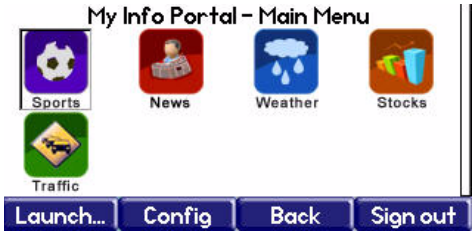


Figure 4-7: SoundPoint IP 450 Main Browser

Navigation and Form Editing Behavior on the Main Browser

The user navigates through pages with the Up and Down arrow keys. The item that is highlighted moves between the items on a page in the order that they appear in the XHTML source, including tables.

When the user has selected a link that they would like to follow, or a text box they would like to toggle, they press the **Select** key. This will either generate a request for the linked page or toggle the selection on the displayed page. The user can enter text, then move to the next selectable item when complete using the Up and Down arrow keys. Long menus can be scrolled past by using the * and # keys (as page up and page down respectively). If there is a large area of the page without editable fields, the page is only scrolled by one screen for each push of the arrow key.

When the user wants to submit their data, they need to scroll to and select a submit button on the page or press the **Submit** soft key when available.

The user can return to the previous page by pressing the **Back** soft key. The Left arrow key performs a similar function unless the user is editing a text field. The **Refresh** and **Home** soft keys behave in the expected manner, reloading the current page and reloading to the phone's home page respectively.

The user can enter text into text boxes using the dial pad through the same entry method used elsewhere on the phone. When editing text, the user can change to uppercase letters, lowercase letters, or numeric entry modes by pressing a special soft key. The user can undo edits by pressing the **Cancel** soft key.

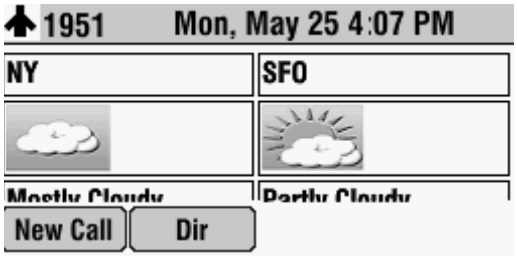
Viewing the Idle Browser

The idle display Microbrowser is independent of the main Microbrowser, but is capable of rendering the same content. Its home page is configured via the `mb.idleDisplay.home` configuration parameter. The idle display Microbrowser does not accept any user input and will only appear when the user has no phone calls in progress and the phone is in the idle user interface state. The content on idle display Microbrowser is updated based on a configurable refresh timer or by honoring the value of the Refresh header.

Examples of the Idle Microbrowser on the SoundPoint IP 670 and SoundStation IP 7000 phones are shown in Figures 4-8 and 4-9.

Figure 4-8: SoundPoint IP 670 Idle Browser

Figure 4-9: SoundStation IP 7000 Idle Browser



Sample Microbrowser Web Applications

This section provides three sample applications that you can use as a starting point for writing your own application for the Microbrowser:

- Static XHTML Application
- Dynamic XHTML Application

- XML API Application

Static XHTML Application

The following instructions show you how to create a static XHTML application that displays 'Hello World!' in the main browser.

To develop a static XML application:

1 Create a sample.xhtml with the following content:

Sample Code 4-5: Hello World

```
<html>
<head>
<title>Sample Application</title>
</head>
<body>
<p>HelloWorld!</p>
</body>
</html>
```

2 Configure the Web server to serve the above XHTML file.

For example, if you are using Apache Tomcat to try this example, then put this file into the `webapps\PLCM` folder of Tomcat.

3 Configure SoundPoint IP and SoundStation IP phones to point to the XHTML file in the **applications.cfg** configuration file.

For this example, change mb.main.home to `http://<WEBSERVER_ADDRESS:PORT>/PLCM/Sample.xhtml`.

4 Reboot the phones.

5 On a SoundPoint IP phone, press the **Applications** key.

The text 'Hello World!' display on the screen.

Note: Supported Web Servers

Static XHTML applications can be developed using any Web server. Even though Tomcat is used in the example, the developer is free to use any Web server.

Dynamic XHTML Application

The following instructions show you how to create a dynamic XHTML application that displays a stock ticker in the main browser.

Note: Take Care When Copying Sample Code

Care should be taken as the lines of code shown below may have wrapped. If you cut and paste these lines, they may contain new-lines where there should not be. Check for valid code before executing.

To develop a dynamic XML application:

1 Create a `addstock.xhtml` with the following content:

Sample Code 4-6: addstock XHTML Example

```
<html xmlns="http://www.w3.org/1999/xhtml">
<!- - HEADER START - ->
<head>
<title>Stocks</title>
</head>
<!- - HEADER END - ->
<!- - BODY START - ->
<body>
<!- - ADD STOCK FORM START - ->
<form method="POST" action="GetQuote.jsp">
<p>Symbol<input type="text" name="stockname"/>
<input type="submit" value="Get Quote"/></p>
</form>
<!- - ADD STOCK FORM END - ->
</body>
<!- - BODY END - ->
<html>
```

2 Configure the Web server to serve the above XHTML file.

For example, if you are using Apache Tomcat to try this example, then put this file into the `webapps\PLCM` folder of Tomcat.

3 Write an application that is going to retrieve the stock information from a data service provider.

For this example Sample Code 4-7, this application will be retrieving stock information from Yahoo and will send it to the Microbrowser. This application is written using a Java Server Page (JSP). Name the file **GetQuote.jsp** .

Sample Code 4-7: Retrieving Stock Information Example

```
<?xml version="1.0" encoding="iso-8859-1"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<%@page
import="java.io.File,java.io.IOException,java.net.URL,java.awt.image.Buf
feredImage,javax.imageio.ImageIO"%>
<html>
<head>
<title>Stock Quote</title>
</head>
<body>
<%
// GETTING THE PATH WHERE BMP FILE HAS TO BE SAVED
String bmpFilePath = application.getRealPath(File.separator) +
"quote.bmp";
// DEFINE URL FROM WHERE CONTENT TO BE RETRIEVED
String stockUrl = "http://ichart.yahoo.com/t?s=";
// RETRIEVE THE STOCK SYMBOL FROM REQUEST
String stockSymbol = "PLCM"; // DEFAULT TO PLCM
if ( request.getParameter("stockname") != null ) {
stockSymbol = request.getParameter("stockname");
}
readAndConvertContentToBmp(stockUrl + stockSymbol, bmpFilePath,
stockSymbol);
%>
<%!
// READ THE CONTENT FROM GIVEN URL AND THEN CONVERT THE CONTENT TO A BMP
FILE
private void readAndConvertContentToBmp(String a_stockUrl, String
a_filePath, String a_name) throws IOException {
try {
BufferedImage stockImage = ImageIO.read(new URL(a_stockUrl));
ImageIO.write(stockImage, "bmp", new File(a_filePath));
}
catch (IOException ex) {   throw ex;   }
}
%>
<!-- START DISPLAY BMP FILE -->
<img src="quote.bmp"/>
```

```
<!-- END DISPLAY BMP FILE -->
</body>
</html>
```

4 Configure the Web server to deploy the above JSP file.

For example, if you are using Apache Tomcat to try this example, put this file into the `webapps\PLCM` folder of Tomcat.

5 Configure SoundPoint IP and SoundStation IP phones to point to the XHTML file in the **applications.cfg** configuration file.

6 For this example, change mb.main.home to `http://<WEBSERVER_ADDRESS:PORT>/PLCM/AddStock.xhtml`.

7 Reboot the phones.

8 On a SoundPoint IP phone, press the **Applications** key.

The `AddStock.xhtml` displays on the screen.

9 Enter a stock symbol, then select the **Get Quote** soft key.

The stock quote for the entered stock symbol displays on the screen.

Note: Applications Can Be Developed on Any Web Servers

Dynamic XHTML applications can be developed using any Web server. Even though Tomcat is used in the example, you are free to use any Web server you choose.
Dynamic XHTML applications can be developed using any Web technologies—for example, ASP.net, Java Servlets, Java Server Pages, CGI-PERL, and PHP.

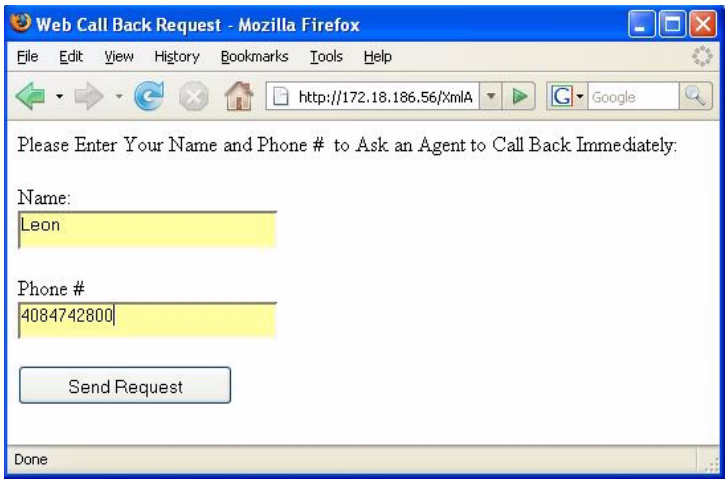
XML API Application

The following instructions show you how to create a XML API application that provides a callback request in the main browser.

This example uses a Telephone Integration URI:

- This is an ASP.NET sample for an IIS Server.

- A customer is browsing a company's web site on the internet. They come upon this web page (`http://A_Web_Site/WebCallback.aspx`), and enter their name and phone number as shown next.



- After the customer clicks Send Request, the page shown below is pushed to the customer support agent's phone.

The customer support agent can call the customer by just pressing the **Select** key, because the highlighted link contains a Tel URI with the customer's phone number.

Note: Example has Wrapped Lines

Be aware that the lines of code shown next are formatted to fit this page and may appear wrapped. If you cut and paste these lines, they may inadvertently contain line breaks. Check for valid code before executing.

To develop an XML API application:

1 Using your integrated development environment (IDE) of choice, create a new file and name this file `webcallback.aspx` .

Sample Code 4-8: webcallback XHTML Example

```
<%@ Page Language="C#" AutoEventWireup="true"
CodeFile="WebCallback.aspx.cs" Inherits="WebCallback" %>

<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">

<html xmlns="http://www.w3.org/1999/xhtml" >
<head runat="server">
    <title>Web Call Back Request</title>
</head>
<body>
    <form id="form1" runat="server">
    <div>
        Please Enter Your Name and Phone #  to Ask an Agent to Call
Back Immediately:<br />
        <br />
        Name:<br />
        <asp:TextBox ID="BoxName" runat="server" Height="23px"
Width="192px"></asp:TextBox><br />
        <br />
        Phone #<br />
        <asp:TextBox ID="BoxNumber" runat="server" Height="22px"
Width="192px"></asp:TextBox><br />
        <br />
        <asp:Button ID="Button1" runat="server" Height="30px"
OnClick="Button1_Click" Text="Send Request"
            Width="162px" /></div>
    </form>
</body>
</html>
```

2 Using the IDE of your choice, create a file called `webcallback.aspx.cs`.

Sample Code 4-9: webcallback C Example

```
using System;
using System.IO;
using System.Text;
using System.Data;
using System.Configuration;
```

```
using System.Net;
using System.Web;
using System.Web.Security;
using System.Web.UI;
using System.Web.UI.WebControls;
using System.Web.UI.WebControls.WebParts;
using System.Web.UI.HtmlControls;
using System.Threading;

public partial class WebCallback : System.Web.UI.Page
{
    public static ManualResetEvent allDone = new
ManualResetEvent(false);
    protected void Page_Load(object sender, EventArgs e)
    {

    }

    protected void Button1_Click(object sender, EventArgs e)
    {
        String phoneNum = BoxNumber.Text ;
        String name = BoxName.Text;

        //send a push request to the phone with the IP address
        //NOTE: Change this hardcoded IP address
        callbackReq("172.18.103.32", phoneNum, name);

    }


    private void callbackReq(String phoneIP, String phoneNum, String
name)
    {
        String strLoc = "http://" + phoneIP + "/push";
        String[] cred = { "Polycom", "456" };

        NetworkCredential myCred = new NetworkCredential(cred[0],
cred[1]);

        CredentialCache myCache = new CredentialCache();

        myCache.Add(new Uri(strLoc), "Digest", myCred);

        string result = "";
```

```
        // Create the web request
        HttpWebRequest request =
(HttpWebRequest)WebRequest.Create(strLoc);

        WebRequestState myRequestState = new WebRequestState();
        myRequestState.request = request;

        request.Method = "POST";
        request.Credentials = myCache;

        myRequestState.createPostData(phoneNum, name);

        IAsyncResult r = (IAsyncResult)request.BeginGetRequestStream(
            new AsyncCallback(ReadCallback), myRequestState);

        allDone.WaitOne();

        // Get response
        HttpWebResponse response =
(HttpWebResponse)request.GetResponse();

        // Get the response stream
        StreamReader reader = new
StreamReader(response.GetResponseStream());

        // Read the whole contents and return as a string
        result = reader.ReadToEnd();

        reader.Close();
        response.Close();

    }

    private static void ReadCallback(IAsyncResult asynchronousResult)
    {

        WebRequestState myRequestState =
(WebRequestState)asynchronousResult.AsyncState;
        WebRequest myWebRequest = myRequestState.request;

        // End the Asynchronus request.
        Stream streamResponse =
myWebRequest.EndGetRequestStream(asynchronousResult);
```

```
        byte[] byteArray =
Encoding.UTF8.GetBytes(myRequestState.getPostData());

        // Write the data to the stream.
        streamResponse.Write(byteArray, 0, byteArray.Length);
        streamResponse.Close();
        allDone.Set();
    }

}

public class WebRequestState
{
    public String postData = null;

    public WebRequest request;
    public WebRequestState()
    {
        request = null;
    }

    public String getPostData()
    {
        return postData;
    }

    public void createPostData(String phoneNum, String name)
    {
        postData =
            "<PolycomIPPhone><Data Priority=\"Critical\">" +
            "<title>Customer Web Call Back Request</title>" +
           " <h1>Customer Name : " + name + " </h1> <br></br>" +
            "<a href=\"tel://" + phoneNum + ";Line1\">Callback to
Customer</a>" +
            "</Data></PolycomIPPhone>";

    }
}
```

3 Configure the IIS Web server to deploy the preceding files.

4 Change the **applications.cfg** configuration file as follows:

- Set `apps.push.username` to **Polycom**.

- Set `apps.push.password` to **456**.

The phone's IP address is hardcoded in `webcallback.aspx.cs` to **172.18.103.32** for this example. You must change this to another value,noted in the code.

5 Reboot the phone.

After a customer enters their name and phone number on the web page, the Customer Web Call Back Request page appears on the phone with IP address hardcoded in the `webcallback.aspx.cs` file.

Chapter 5: Using Relevant UCS Configuration Parameters

This chapter shows system administrators how to use the configuration files that accompany the Polycom® UC Software to configure the phones to run the newly-created Web applications. The configuration parameters dictate the behavior of the phone once it is running the executable specified in the master configuration file.

Caution: Only Knowledgeable Administrators Should Modify the Configuration Files

Only a knowledgeable system administrator should modify configuration files. If you apply incorrect parameters, your phone may not be usable. The configuration files that accompany a specific UC Software release must be used only with that software. Failure to do this may render the phone unusable.

You can also make changes to the configuration parameters through the Polycom Web Configuration Utility. To use the utility, enter the phone's IP address as the browser address in a Web browser. For more information, see the latest *Polycom UC Software Administrators' Guide*. Changes made through the Web Configuration Utility are written to the Web override file if you made these changes when logged in as an administrator.

A number of template files are included with the Polycom UC Software 4.0.1 release. Most of configuration parameters that you will need can be found in the **applications.cfg** file.

The parameters described in this chapter include those for:

- Web applications
- Push requests
- Telephone event notifications
- Phone state polling

A sample configuration is shown in Sample Configuration.

Web Application Configuration Parameters

The parameters shown in the following table control the home page, proxy and size limits to be used by the Microbrowser and Browser when it is selected to provide services.

Table 5-1: Microbrowser and Web Browser Parameters

Parameter	*Permitted Values*	*Default*
mb.idleDisplay.home	**Null or any fully formed valid HTTP URL. Length up to 255 characters.**	**Null**
The URL for the Microbrowser/Browser home page that is shown on the idle display Microbrowser/Browser Home page. For example: http://www.example.com/xhtml/frontpage. If Null, there is no idle display Microbrowser/Browser. Note that the Microbrowser/Browser idle display will displace the idle display indicator.		
mb.idleDisplay.refresh	**0 or an integer > 5**	**0**
The time period in seconds that the Microbrowser/Browser 's idle display will refresh. If set to 0, the idle display Microbrowser/Browser does not refresh. The minimum refresh period is 5 seconds (values from 1 to 4 are ignored, and 5 is used). *Note*: If an HTTP Refresh header is detected, it will be respected, even if this parameter is set to 0. The refresh parameter will be respected only in the event that a refresh fails. Once a refresh is successful, the value in the HTTP refresh header, if available, will be used.		
mb.main.autoBackKey[1]	**0 or 1**	**1**
If 0, the phone does not provide a **Back** soft key; all soft keys are created and controlled by the application. If 1, the phone automatically supplies a **Back** soft key in all main browser screens. The **Back** soft key will take the user back to the previous page in the browser history.		
mb.main.home	**Any fully formed valid HTTP URL. Length up to 255 characters.**	**Null**
The URL of the Microbrowser/Browser's Home page. For example: *http://www.example.com/xhtml/frontpage/home*. If blank, the Microbrowser/Browser will notify the user that a blank home-page was used.		
mb.main.idleTimeout	**0 - 600, seconds**	**40**
The timeout, in seconds, for the interactive Microbrowser/Browser . If the interactive Microbrowser/Browser remains idle for the defined period of time, the phone returns to the idle browser. If 0, there is no timeout.		
mb.main.statusbar	**0 or 1**	**0**
If 0, the status bar does not display. If 1, the status bar displays and status messages are shown.		
mb.main.toolbar.autoHide.enabled[2]	**0 or 1**	**1**
If 0, the toolbar displays continually. If 1, the toolbar disappears if not selected.		

Parameter	*Permitted Values*	*Default*
mb.proxy	**Null or domain name or IP address in the format <address>:<port>**	**Null. Default port = 8080**
The address of the HTTP proxy to be used by the Microbrowser/Browser. If blank, normal unproxied HTTP is used by the Microbrowser /Browser.		

1 Change causes phone to restart or reboot.

2 For the SpectraLink 8400 Series handsets, the toolbar autohide is disabled by default.

Configuring Push Request Parameters

The <apps.push/> parameters are used to control push server controls.

Table 5-2: Push Request Parameters

Parameter	*Permitted Values*	*Default*
apps.push.alertSound	**0 or 1**	**0**
If 0, there is no sound when an alert is pushed. If 1, there is sound.		
apps.push.messageType	**0 to 5**	**0**
Set which push priority messages should display on the phone. The possible values are: **0**: (None) Discard push messages **1**: (Normal) Allows only Normal priority push messages **2**: (Important) Allows only Important priority push messages **3**: (High) Allows only High priority push messages **4**: (Critical) Allows only Critical priority push **5**: (All) Allows all push messages of any priority		
apps.push.password	**string**	**null**
The password to access the push server URL.		
apps.push.secureTunnelEnabled	**0 or 1**	**1**
If 0, the Web server is not connected through a secure tunnel. If 1, the Web server is connected through a secure tunnel.		
apps.push.secureTunnelPort	**1 to 65535**	**443**
The port that the phone should use to communicate to the Web server when the secure tunnel is used.		
apps.push.secureTunnelRequired	**0 or 1**	**0**
If 0, communications to the Web server do not require a secure tunnel. If 1, communications require a secure tunnel.		

Parameter	*Permitted Values*	*Default*
apps.push.serverRootURL	**URL**	**null**
The application server root URL. The relative URL received from the HTTP push message is appended to this root URL, and the combined URL is sent to the (micro)browser. For example, if the application server root URL is http://172.24.128.85:8080/sampleapps and the relative URL is /examples/sample.html, the URL that is sent to the microbrowser is http://172.24.128.85:8080/sampleapps/examples/sample.html. Can be either HTTP or HTTPS.		
apps.push.username	**string**	**null**
The user name to access the push server URL. *Note*: To enable the push functionality, the parameters `apps.push.username` and `apps.push.password` must both be set (not null).		

Configuring Telephone Event Notification Parameters

The <`apps.telNotification`/> parameter is used to control telephone notification events.

Table 5-3: Telephone Event Notification Parameters

Parameter	*Permitted Values*	*Default*
apps.telNotification.callStateChangeEvent	**0 or 1**	**0**
If 0, call state change notification is disabled. If 1, notification is enabled.		
apps.telNotification.incomingEvent	**0 or 1**	**0**
If 0, incoming call notification is disabled. If 1, notification is enabled.		
apps.telNotification.lineRegistrationEvent	**0 or 1**	**0**
If 0, line registration notification is disabled. If 1, notification is enabled.		
apps.telNotification.offhookEvent	**0 or 1**	**0**
If 0, off-hook notification is disabled. If 1, notification is enabled.		
apps.telNotification.onhookEvent	**0 or 1**	**0**
If 0, on-hook notification is disabled. If 1, notification is enabled.		
apps.telNotification.outgoingEvent	**0 or 1**	**0**
If 0, outgoing call notification is disabled. If 1, notification is enabled.		
apps.telNotification.userLogInOutEvent	**0 or 1**	**0**
If 0, user login/logout notification is disabled. If 1, notification is enabled.		

Parameter	*Permitted Values*	*Default*
apps.telNotification.URL	**URL**	**null**
The URL to which the phone sends notifications of specified events. Can be either HTTP or HTTPS.		
apps.telNotification.x.URL	**URL**	**null**
The URL to which the phone sends notifications of specified events, where x 1 to 9. Can be either HTTP or HTTPS. These parameters, combined with apps.telNotification.URL allow you to register up to 10 URLs to receive events.		

Note: Limitation for Server URLs

The configured events will be sent to all server URLs. There is no way you can configure a few events for a specific server and remaining events for another server.
The Web Configuration Utility also does not allow you to set parameters individually for each server URL. If you select an event for any server, it is selected for all 10 server URLs.

Configuring Phone State Polling Parameters

The <`apps.statePolling`/> parameter is used to control state polling events.

Table 5-4: Telephone Event Notification Parameters

Parameter	*Permitted Values*	*Default*
apps.statePolling.password	**string**	**null**
The password to access the state polling URL.		
apps.statePolling.URL	**URL**	**null**
The URL to which the phone sends call processing state/device/network information. The protocol used can be either HTTP or HTTPS. Note: To enable state polling, the parameters `apps.statePolling.URL`, `apps.statePolling.username`, and `apps.statePolling.password` must be set to non-null values.		
apps.statePoling.responseMode	**0 or 1**	**1**
The mode of sending requested polled data. If 1, requested polled data is sent to a configured URL. If 0, the data is sent in the HTTP response back to the requestor.		
apps.statePolling.username	**string**	**null**
The user name to access the state polling URL.		

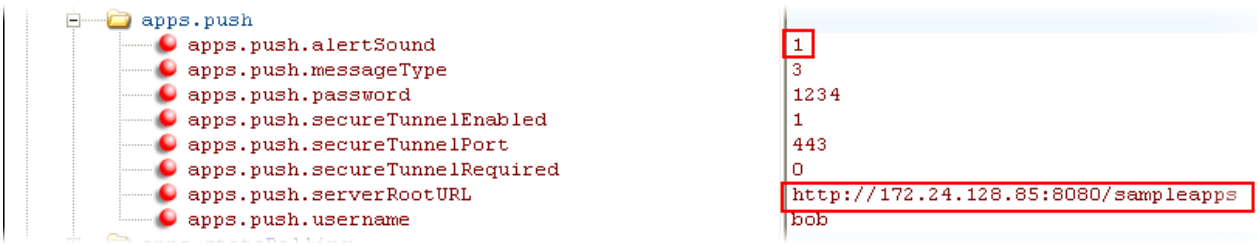
Sample Configuration

The following sample configuration shows you how to enable your users to use the Web applications that you developed.

In this example:

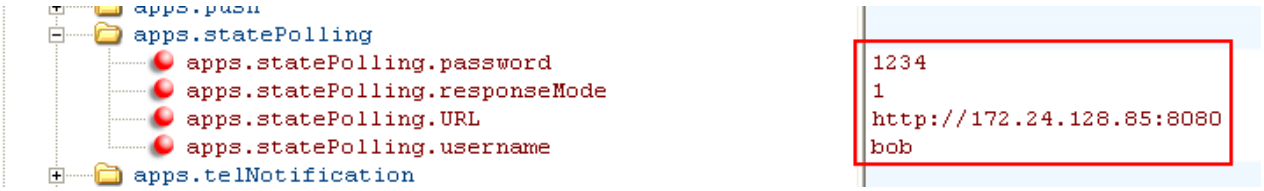
- `mb.proxy` is set to the address of the desired HTTP proxy to be used by the Microbrowser or Browser. For example, **10.11.32.103:8080**.
- `mb.idleDisplay.home` is set to the URL used for the Microbrowser or Browser idle screen home page. For example, http://10.11.32.128:8080/sampleapps/idle .
- `mb.idleDisplay.refresh` is set to the period in seconds between refreshes of the idle display Microbrowser or Browser's content.
- `mb.main.home` is set to the URL used for the Microbrowser or Browser home page. For example, http://10.11.32.128:8080/sampleapps/login .

- `apps.push.alertSound` is set to 1, so a sound is played when an alert is pushed.
- `apps.push.messageType` is set to the appropriate display priority. For example, **3** – Important Priority messages only.
- `apps.serverRootURL` is set to the application server root URL. For example, http://172.24.128.85:8080/sampleapps .
- `apps.push.username` is set to the appropriate user name. For example, **bob**.
- `apps.push.password` is set to the appropriate password. For example, **1234**.



- `apps.telNotification.URL` is set to the URL where notifications should be sent. For example, http://172.24.128.85:8080.
- `apps.telNotification.offhookEvent` is set to 1 to enable notifications for off-hook events.
- `apps.telNotification.onhookEvent` is set to 1 to enable notifications for on-hook events.
- `apps.telNotification.userLogInOut` is set to 1 to enable notifications for user login and logout events.
- `apps.telNotification.callStateChange` is set to 1 to enable notifications for call state change events.

- `apps.statePolling.URL` is set to the location where requested state polling information should be sent. For example, http://172.24.128.85:8080.
- `apps.statePolling.responseMode` is set to send the requested state polling information to the configured URL, **1**, instead of back to the requestor.
- `apps.statePolling.username` is set to the appropriate username. For example, **bob**.
- `apps.statePolling.password` is set to the appropriate password. For example, **1234**.



Chapter 6: Debugging and Troubleshooting

The browsers that best match the phone's Browser are Chrome or Safari, as they are built on WebKit as well. They can be used to test rendering issues on the computer before testing them on the phone's Browser.

When debugging web pages, the Inspect Element in the phone simulator and in Chrome is very helpful in finding coding issues. Also, Firebug is a useful Firefox add-on that can be used to debug Web pages.

A useful debugging process is as follows:

1. Use Firebug (in Firefox) or 'Inspect' (in Chrome or the phone simulator) to check for JavaScript errors.
2. User Firebug (in Firefox) or 'Inspect' (in Chrome or the phone simulator) to check that all asynchronous requests are working properly.
3. Determine if there are server errors; if there are, use the generated error messages / Apache logs to figure out the error.

Repeat this process until there are no errors.

Polycom has an active Developer Community Forum where you can find more sample code as well as answers to many common developer questions. You can also post questions to Polycom support experts and other developers.

This chapter also presents problems, likely causes, and corrective actions. Problems are organized into the following categories:

- Understanding Microbrowser Application Errors

Understanding Microbrowser Application Errors

The following table describes possible solutions to Microbrowser Application errors.

Table 6-1: Troubleshooting Microbrowser Application Errors

Improperly formatted tables could cause the phone to stop and restart or display the error 'XML Error (17,75) mismatched tag'.
Solution: Correct the improperly formatted table.

Table 6-2: Troubleshooting Browser Application Errors

Pushed message is not getting displayed in browser.
Push message will be displayed on browser based on the priority of the message. See Table 3-6: How Priority Affects URL Push Requests.
The 'Server Not Found' error usually occurs on the phone after a URL Push when the `apps.push.serverRootURL` parameter is set incorrectly and the phone cannot resolve the URL to a valid page.
Partial page is rendered on a Data Push after a long delay – If a Data Push is sent with URLs for additional page elements embedded in it that are not valid, the phone will first show a blank page with a very slow moving (or even stopped) progress bar and will eventually render only the elements it was able to retrieve. Check that the URLs for any additional page elements are correct and reachable by the phone (firewalls, VLANs, for example, can present barriers).

Part III: References

Part III gives you an overview of the Polycom® phones and of the Polycom UC Software and consists of the following chapters:

- Chapter 7: Miscellaneous Information
- Chapter 8: Third Party Software

Chapter 7: Miscellaneous Information

This chapter provides you with information on the following topics:

- Unsupported XHTML elements on the Microbrowser
- JavaScript Examples for the Browser

Unsupported XHTML elements on the Microbrowser

This section provides information on XHTML elements that are not supported by the Microbrowser.

The unsupported elements and attributes are:

Table 7-1: Unsupported Elements and Attributes

Tag Type	*Tag Description*
Basic Tags	<html>—Defines HTML document.
	<body>—Defines documents' body.
	<h1> to <h6>—Defines header 1 to header 6.
	<p>—Defines a paragraph.
	 —Inserts a single line break.
	<hr>—Defines a horizontal rule.
Character Format Tags	<b>—Defines bold text.
	<font>—Deprecated. Defines text font, size, and color.
	<i>—Defines italic text.
	—Defines emphasized text.
	<big>—Defines big text.
	—Defines strong text.
	<small>—Defines small text.
	<sup>—Defines superscripted text.
	<sub>—Defines subscripted text.

Tag Type	*Tag Description*
	<bdo>—Defines the direction of text display.
	<u>—Deprecated. Defines underlined text.
Output Tags	<pre>—Defines preformatted text.
	<code>—Defines computer code text.
	<tt>—Defines teletype text.
	<kbd>—Defines keyboard text.
	<var>—Defines a variable.
	<dfn>—Defines a definition term.
	<samp>—Defines sample computer code.
	<xmp>—Deprecated. Defines preformatted text.
Block Tags	<acronym>—Defines an acronym.
	<abbr>—Defines an abbreviation.
	<address>—Defines an address element.
	<blockquote>—Defines a long quotation.
	—Deprecated. Defines centered text.
	<q>—Defines a short quotation.
	<cite>—Defines a citation.
	<ins>—Defines inserted text.
	<del>—Defines deleted text.
	<s>—Deprecated. Defines strikethrough text.
	<strike>—Deprecated. Defines strikethrough text.
Link Tags	<a>—Defines an anchor. The following attributes are not supported: charset, coords, hreflang, rel, rev, shape, target, type, id, class, title, style, dir, lang, xml:lang, tabindex, and accesskey.
	<link>—Defines a resource reference.
Frame Tags	<frame>—Defines a sub window (frame).

Tag Type	*Tag Description*
	<frameset>—Defines a set of frames.
	<noframes>—Defines a noframe section.
	<iframe>—Defines an inline sub window (frame).
Input Tags	<form>—Defines a form. The following attributes are not supported: accept, accept charset, enctype, target, class, id, style, title, dir, lang, and accesskey.
	<input>—Defines an input field. The following attributes are not supported: accept, align, alt, disabled, maxlength, readonly, size, arc, type:button, type:file, type:image, class, is, style, title, dir, lang, accesskey.
	<textarea>—Defines a text area.
	<button>—Defines a push button.
	<select>—Defines a selectable list.
	<optgroup>—Defines an option group.
	<option>—Defines an item in a list box.
	<label>—Defines a label for a form control.
	<fieldset>—Defines a fieldset.
	<legend>—Defines a title in a fieldset.
	<isindex>—Deprecated. Defines a single-line input field.

Tag Type	*Tag Description*
List Tags	—Defines an unordered list.
	—Defines an ordered list.
	—Defines a list item.
	<dir>—Deprecated. Defines a directory list.
	<dl>—Defines a definition list.
	<dt>—Defines a definition term.
	<dd>—Defines a definition description.
	<menu>—Deprecated. Defines a menu list.
Image Tags	<img>-Defines an image. The following attributes are not supported: alt, align, border, hspace, ismap, longdesc, usemap, vspace, id, class, title, style, xml:lang, and lang
	<map>—Defines an image map.
	<area>—Defines an area inside an image map.
Table Tags	<table>—Defines a table. The following atrributes are not supported: bgcolor, frame, rules, summary, id, class, title, style, dir, lang, and xml:lang.
	<col>—Defines attributes for table columns.
	<tr>—Defines a table row. The following attributes are not supported: bgcolor, cahr, charoff, valign, id, class, title, style, dir, lang, and xml:lang.
	<td>—Defines a table cell. The following attributes are not supported: abbr, axis, bgcolor, char, charoff, headers, height, nowrap, scope, valign, width, id, class, title, style, dir, lang, and xml:lang.
	<tbody>—Defines a table body. The following attributes are not supported: align:justify, align:char, char, charoff, valign, id, class, title, style, dir, lang, and xml:lang.
	<colgroup>—Defines groups of table columns.
Style Tags	<style>—Defines a style definition.
	—Defines a section in a document.

Tag Type	*Tag Description*
	—Defines a section in a document.
Meta Information Tags	<head>—Defines information about the document. No attributes are supported.
	<title>—Defines the document title.
	<meta>—Defines meta information
	<base>—Defines a base URL for all the links in a page
	<basefont>—Deprecated. Defines a base font
Programming Tags	<script>—Defines a script
	<noscript>—Defines a noscript section
	<applet>—Deprecated. Defines an applet
	<object>—Defines an embedded object
	<param>—Defines a parameter for an object

JavaScript Examples for the Browser

This section provides JavaScript examples that work in conjunction with the Browser on Polycom® VVX® 500 and 1500 phones and SpectraLink® 8400 Series handsets unless otherwise noted.

Note: Examples have Wrapped Lines

Care should be taken as the lines of code shown below may have wrapped. If you cut and paste these lines, they may contain new-lines where there should not be. Check for valid code before executing.

Control of Soft Keys of SpectraLink 8400 Series Handsets

The following example shows how to control soft keys.

Sample Code 7-1: Soft Key Control Example for SpectraLink 8400 Series Handsets

```
html>
   <head>
      <Title>Softkey JavaScript Test</Title>
      <script type="text/javascript">
         // PolySoftKey is the exported DOM object
         // Registers a JavaScript function to be executed when a custom
softkey event occurs
         PolySoftKey.customSoftkeyEvent.connect(skCallBack);

         PolySoftKey.setSoftkeyLabel(0, "one");
         PolySoftKey.setSoftkeyLabel(1, "Two");
         PolySoftKey.setSoftkeyLabel(2, "Three");
         PolySoftKey.setSoftkeyLabel(3, "Four");

         function skCallBack(key, skEvent){
            switch(key){
            case 0:
               document.getElementById("eventStuff").innerHTML = "SK 1 was
pressed";
               break;
            case 1:
               document.getElementById("eventStuff").innerHTML = "SK 2 was
pressed";
               break;
            case 2:
               document.getElementById("eventStuff").innerHTML = "SK 3 was
pressed";
               break;
            case 3:
               document.getElementById("eventStuff").innerHTML = "SK 4 was
pressed";
               break;
            }
            document.getElementById("eventValue").innerHTML = skEvent;
       }

         // hide the tool bar
         function hideSKs(){
            PolySoftKey.hideToolBar();
```

```
         }

         // show the tool bar
         function showSKs(){
            PolySoftKey.showToolBar();
         }

         // get the styled points of the SKs so app can add whatever object
they want to that area
         // after calling hideToolBar()
         function getSKPoints(){
            // Returns a JSON object with two properties, X & Y.  To
convert to JS object you must
            // use the eval function on the JSON object.
            var one = PolySoftKey.getSoftkeyPoint(0);
            var oneObj = eval('(' + one + ')'); //to help avoid syntax
errors, wrap with '(' ')' chars

            var two = PolySoftKey.getSoftkeyPoint(1);
            var twoObj = eval('(' + two + ')');

            var three = PolySoftKey.getSoftkeyPoint(2);
            var threeObj = eval('(' + three + ')');

            var four = PolySoftKey.getSoftkeyPoint(3);
            var fourObj = eval('(' + four + ')');

            document.getElementById("points").innerHTML = oneObj.X + ":" +
oneObj.Y + "," + twoObj.X + ":" + twoObj.Y + "," + threeObj.X + ":" +
threeObj.Y + "," + fourObj.X + ":" + fourObj.Y;
            }
      </script>
   </head>
   <body onload="onInit()">
      <div id="showButton">
         <input type='button' onclick='showSKs()' value='Show Softkeys'/>
      </div>
      <div id="hideButton">
         <input type='button' onclick='hideSKs()' value='Hide Softkeys'/>
      </div>
      <div id="eventText">
         <p>Last Click: <b id='eventStuff'>0</b> </p>
         <p>Event Value: <b id='eventValue'>0</b> </p>
      </div>
      <div id="clickPos">
```

```
         <input type='button' onclick='getSKPoints()' value='Show Points'/>
         <p id="points"></p>
      </div>
   </body>
</html>
```

Bar Code Data Notification of SpectraLink 8450 and 8452 Handsets

The following example shows how to capture bar code data in the Browser, if the data is scanned while the Browser is displayed.

Sample Code 7-2: Barcode Data Notification Example for SpectraLink 8450 and 8542 Wireless Handsets

```
<html>
   <head>
      <Title>BarCode JavaScript Test</Title>
      <script type="text/javascript">
         //Registers a JavaScript function to be executed upon new
barcode data
         PolyBarCode.newDataSig.connect(bcCallBack);

         //Optional calls, default insert is enable by default
         PolyBarCode.enableDefaultInsert();
         //PolyBarCode.disableDefaultInsert();
         function bcText(data){
            document.getElementById("bcStuff").innerHTML =
PolyBarCode.getLastBarCode();
         }
         function bcCallBack(barCode){
            document.getElementById("bcStuffRT").innerHTML = barCode;
            document.FORM.BC.value = barCode;
         }
      </script>
   </head>
   <body onload="onInit()">
      <div id="bcLabel">
         <p>Show Last BC: <b id='bcStuff'>0</b> </p>
         <input type='button' onclick='bcText()' value='Show Last Bar
Code'/>

      </div>
      <div id="bcLabe2">
```

```
         <p>Show Realtime BC: <b id='bcStuffRT'>0</b> </p>
      </div>
      <div id="bcText">
         <input type='text' value='Click to Test Insert'/>
      </div>
      <form name="FORM">

         <input type="text" name="BC" value="" size="15"
maxlength="20"></input>
      </form>
   </body>
</html>
```

Keypad Captures

The following example shows how to capture keypad keys and how to map this to an HTML button (specifically to cause a button click based on pressing the **1** dialpad key).

Sample Code 7-3: Keypad Capture Example

```
<title>JavaScript key press event</title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1" />
<script type="text/javascript">
document.onkeyup = KeyCheck;

function KeyCheck(e)
{
var KeyID = (window.event) ? event.keyCode : e.keyCode;

switch (KeyID)
{ case 49: document.Form1.KeyName.click(); break; default: break;}

}
</script>
</head>

<body>
<form name="Form1">
<input type="button" name="KeyName" value="Click or press (1) to Continue"
/>
</form>
</body>
```

```
</html>
```

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Dropbear	Dropbear
eXpat	eXpat
freetype	freetype
gloox	gloox
ILG JPEG	IJG JPEG
libcurl	libcurl
libMng	libMng
liboil	liboil
libpcap	libpcap
libPng V2	libpng V2
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IJG JPEG

Independent JPEG Group's free JPEG software

This package contains C software to implement JPEG image encoding, decoding, and transcoding. JPEG is a standardized compression method for full-color and gray-scale images.

The distributed programs provide conversion between JPEG "JFIF" format and image files in PBMPLUS PPM/PGM, GIF, BMP, and Targa file formats. The core compression and decompression library can easily be reused in other programs, such as image viewers. The package is highly portable C code; we have tested it on many machines ranging from PCs to Crays.

We are releasing this software for both noncommercial and commercial use. Companies are welcome to use it as the basis for JPEG-related products. We do not ask a royalty, although we do ask for an acknowledgement in product literature (see the README file in the distribution for details). We hope to make this software industrial-quality --- although, as with anything that's free, we offer no warranty and accept no liability.

For more information, contact jpeg-info@jpegclub.org.

Contents of this directory

jpegsrc.vN.tar.gz contains source code, documentation, and test files for release N in Unix format.

jpegsrN.zip contains source code, documentation, and test files for release N in Windows format.

jpegaltui.vN.tar.gz contains source code for an alternate user interface for cjpeg/djpeg in Unix format.

jpegaltuiN.zip contains source code for an alternate user interface for cjpeg/djpeg in Windows format.

wallace.ps.gz is a PostScript file of Greg Wallace's introductory article about JPEG. This is an update of the article that appeared in the April 1991 Communications of the ACM.

jpeg.documents.gz tells where to obtain the JPEG standard and documents about JPEG-related file formats.

jfif.ps.gz is a PostScript file of the JFIF (JPEG File Interchange Format) format specification.

jfif.txt.gz is a plain text transcription of the JFIF specification; it's missing a figure, so use the PostScript version if you can.

TIFFTechNote2.txt.gz is a draft of the proposed revisions to TIFF 6.0's JPEG support.

pm.errata.gz is the errata list for the first printing of the textbook "JPEG Still Image Data Compression Standard" by Pennebaker and Mitchell.

jdosaobj.zip contains pre-assembled object files for JMEMDOSA.ASM.

If you want to compile the IJG code for MS-DOS, but don't have an assembler, these files may be helpful.

libcurl

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libpcap

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Modifications: Added PACKET_MMAP support

Paolo Abeni <paolo.abeni@email.it>

based on previous works of:

Simon Patarin <patarin@cs.unibo.it>

Phil Wood <cpw@lanl.gov>

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zlib

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9.2. Venue for Resolving Disputes. Any disputes relating to this Agreement will be resolved only in the state or federal courts located in Santa Clara County, California. Each of the parties agrees to the exercise over them of the personal jurisdiction of such courts for such purpose.

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9.4. Relationship Between the Parties. The relationship between you and Polycom is that of licensee/licensor. Neither party will represent that it has any authority to assume or create any obligation, express or implied, on behalf of the other party, nor to represent the other party as agent, employee, franchisee, or in any other capacity. Nothing in this agreement shall be construed to limit either party's right to independently develop or distribute software that is functionally similar to the other party's products, so long as proprietary information of the other party is not included in such software.

9.5. Entire Agreement. This Agreement represents the complete agreement concerning this license and may be amended only by a writing executed by both parties. If any provision of this Agreement is held to be unenforceable, such provision shall be reformed only to the extent necessary to make it enforceable.

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