



**LINKSYS®**  
A Division of Cisco Systems, Inc.

**Connected Office Business Organization**

**Application Note:  
LVS SPA962 & SPA942 Phone Photo Album Display**

**EDCS-651460 v0.3**

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# Introduction

As of firmware release 5.2.2 for the SPA962 and SPA942 Linksys Voice System (LVS) phones, it is possible to display photographs or images on the phones' high resolution display. This application note describes how to configure an HTTP server in order to serve different bitmap image files (bmp) to the LVS SPA962 color phones, producing a photo album-like effect. Sample applications include displaying advertising on a lobby phone, or for displaying photographs from the latest staff outing.

The LVS phone, if configured, will perform an HTTP GET request for a background image when it boots. The phone will honor a REFRESH in the 200 header from the HTTP server and perform another HTTP GET request when the REFRESH period expires. This results in a different image being displayed on the phone, provided the HTTP server is serving a different image at the time of the request.

## Audience

This application note is targeted at anyone who administers or maintains a Linksys telephony environment. It is expected that readers of this document are familiar with the administration tasks involved with LVS components, specifically the SPA962 and SPA942 series of telephones.

## Scope

This document assumes a basic understanding of Microsoft's Windows XP / UNIX, some scripting and command-line skills. This scope of this document is limited to displaying background images on LVS phones and does not address basic LVS configuration or HTTP-related security and so on.

## Related Documents

- [1] SPA9000 Administrator Guide
- [2] SPA9000 User Guide
- [3] Linksys 900 Series IP Phone Administrator Guide
- [4] SPA Provisioning Guide



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# Overview

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Linksys Voice System (LVS) SPA962 color-display and SPA942 monochrome-display phones support displaying ever-changing background pictures or advertisements as a source of entertainment or information. This has the potential of enabling reduced or subsidized service cost and/or enhancing employee moral through digital picture frame like personalization.

The phones request a bitmap image from a server. The server must be especially configured to insert a REFRESH and a refresh time into the header of the bitmap image that it sends to the phone. The phone requests an image update after the REFRESH period and the server sends the phone another image. This Application Note provides terse configuration instruction for both Windows and UNIX servers.

## Implementation

---

This section describes requirements to make this feature function for SPA962 color and SPA942 monochrome phones.

The document does not provide basic LVS, Windows, or UNIX configuration information.

## Requirements

You will need a minimum of the following:

1. HTTP server [Windows and UNIX environments are described in this document]
2. Supply of bitmap (bmp) format photographs or images sized at:
  - SPA962: 320x240 pixels and 1, 4, 8, 24, or 32-bit color [not 16-bit]
  - SPA942: 128x48 pixels and 1-bit color
3. Previously configured LVS system including SPA962 and SPA942 phones

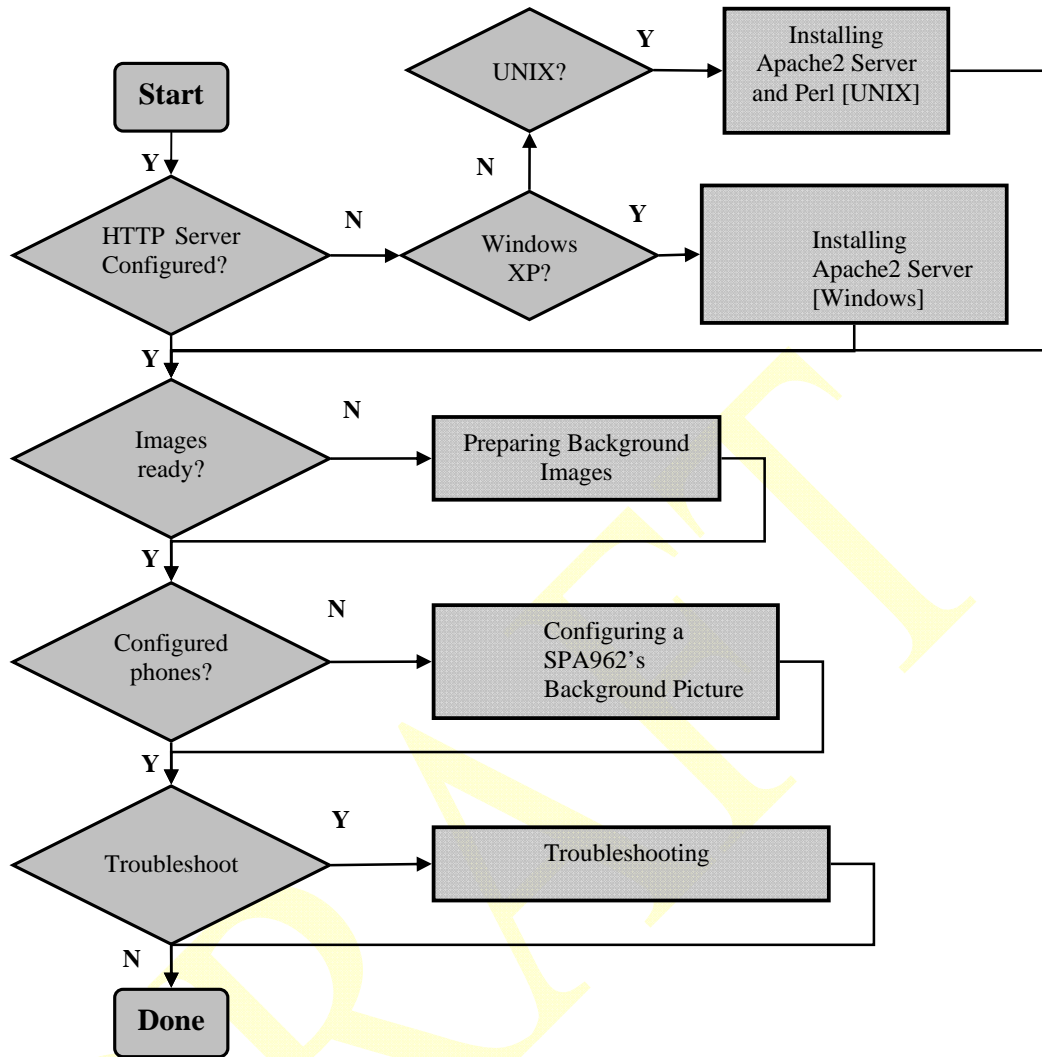


Figure 1: Task Flow Chart for displaying changing backgrounds on SPA962 & SPA942 phones

# Configuring a HTTP Server

The HTTP server must respond with images to HTTP GET requests from the LVS phones. In addition, the HTTP server must respond with a REFRESH time in the header of the image file that it returns to LVS phones. It is the REFRESH time that causes the LVS phone to perform another HTTP GET request, causing its background image to be replaced periodically. The REFRESH is added to the image by a Perl script that will be installed on the HTTP server in the cgi-bin directory. As a best-practice, several REFRESH timers of different lengths are used in order to reduce the load on the server and on the network.

This document uses the following conventions for the REFRESH script:

- SPA-962-PhoneDisplayRefresh\_multi-bit\_<name>.pl
- SPA-942-PhoneDisplayRefresh\_one-bit\_<name>.pl

Replace the <name> with something that describes the image types, for example:

- PhoneDisplayRefresh\_multi-bit\_Sales-Products.pl  
This script would be called by SPA962 phones to display Sales Product images
- PhoneDisplayRefresh\_multi-bit\_Lobby-Advertisements.pl  
This script would be called by SPA962 phones to display advertisement images suitable for a lobby phone
- PhoneDisplayRefresh\_multi-bit\_SallyD.pl  
This script would be called by SallyD's SPA962 phone to display Sally's personal images, perhaps photos of her family and vacation

The only difference between these scripts is the photographs that the scripts point to.

This document demonstrates configuring the Apache2 server and Perl in both a Windows and UNIX environment.

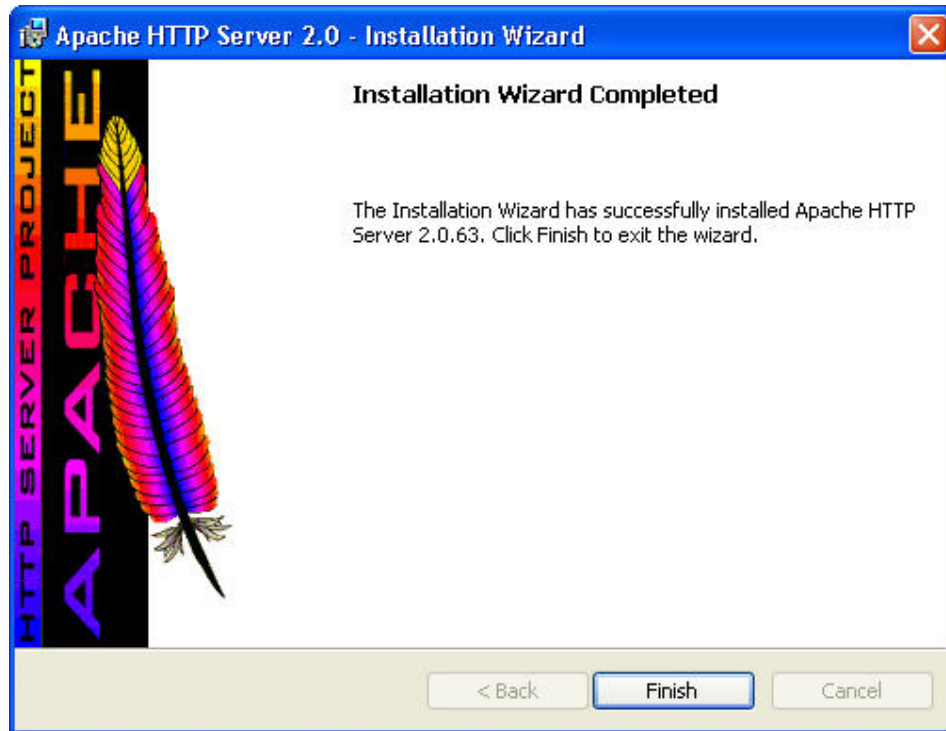
## Installing Apache2 Server [Windows]

Ignore this section if you are using a UNIX HTTP server.

Apache version 2.0.63 is used in this document.

Download and install the Apache2 *Win32 Binary without crypto (no mod\_ssl) (MSI Installer)* from the <http://httpd.apache.org> site.

For the purposes of this document, Apache2 is installed to service port 8080.



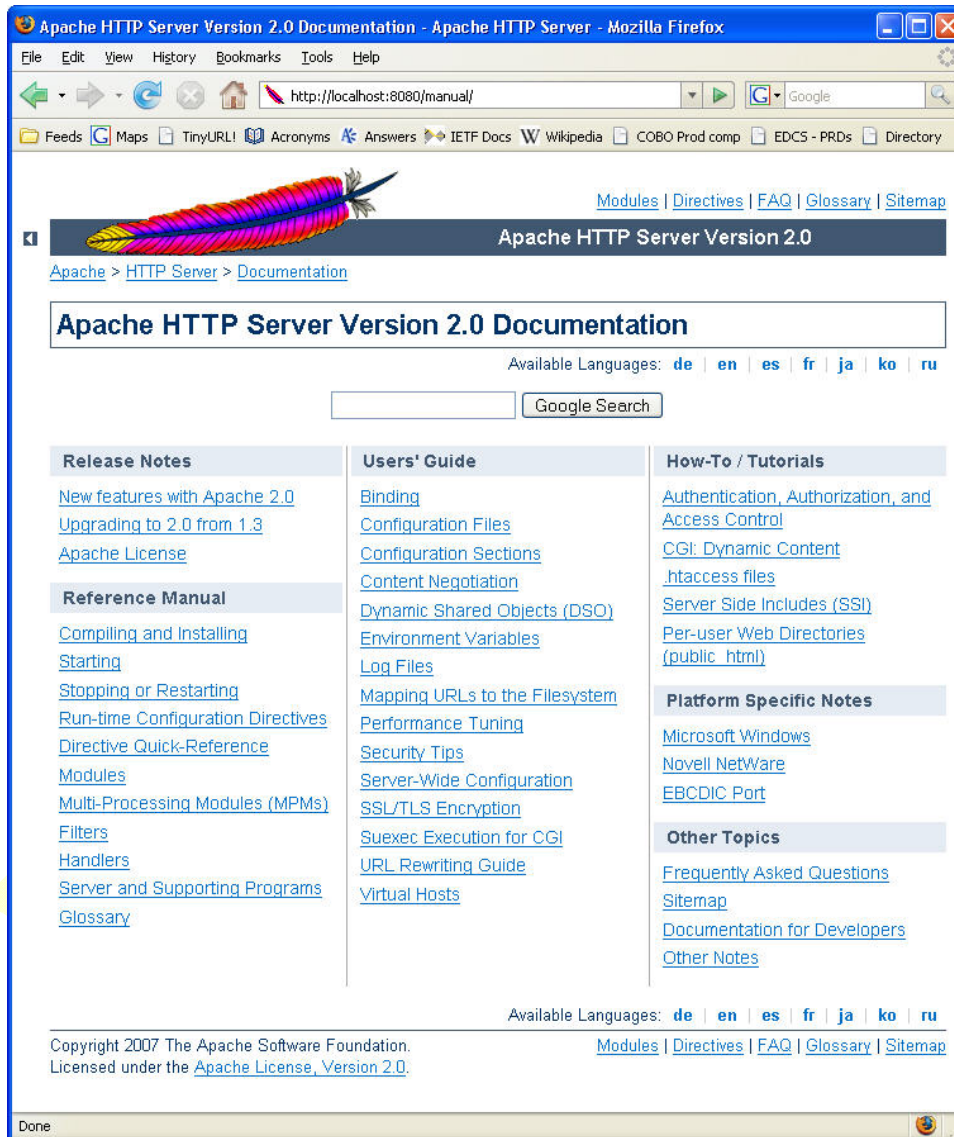
The screenshot indicates that Apache2 version 2.0.63 is successfully installed.



## Testing the Apache2 Installation [Windows]

Ignore this section if you are using a UNIX HTTP server.

Verify that your Apache2 server is properly configured by viewing the local Apache2 manual at the `http://localhost:8080/manual` URL.



Do not continue until you have confirmation your HTTP server is running and responding to HTTP service requests.



## Installing Perl [Windows]

Ignore this section if you are using a UNIX HTTP server.

This documents demonstrates using ActiveState Perl version 5.8.8 (MSI) for Windows (x86). Download and install ActiveState Perl from the <http://www.activestate.com/store/activeperl/download/> site.



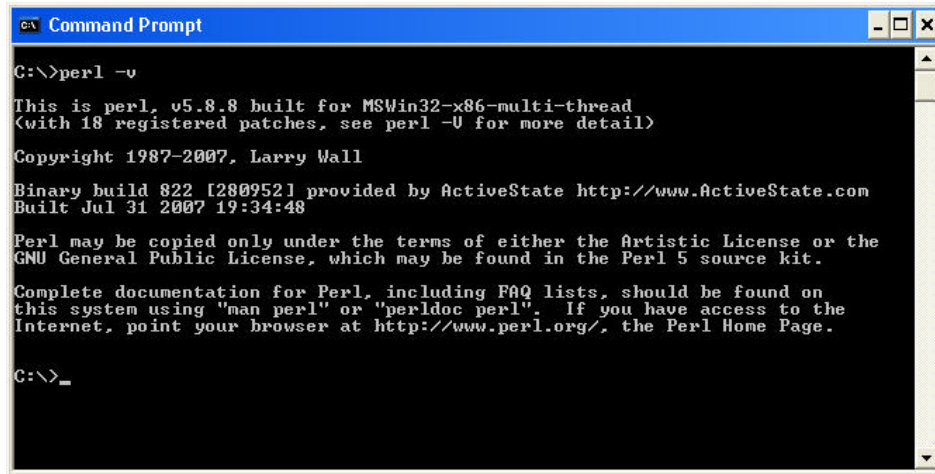
ActiveState Perl automatically configures itself and sets all path information as part of the installation.

## Testing the Perl Installation [Windows]

Ignore this section if you are using a UNIX HTTP server.

Verify that your Perl installation is properly configured by:

1. Opening a command prompt window and running the `perl -v` command



```
Command Prompt
C:\>perl -v
This is perl, v5.8.8 built for MSWin32-x86-multi-thread
(with 18 registered patches, see perl -U for more detail)
Copyright 1987-2007, Larry Wall

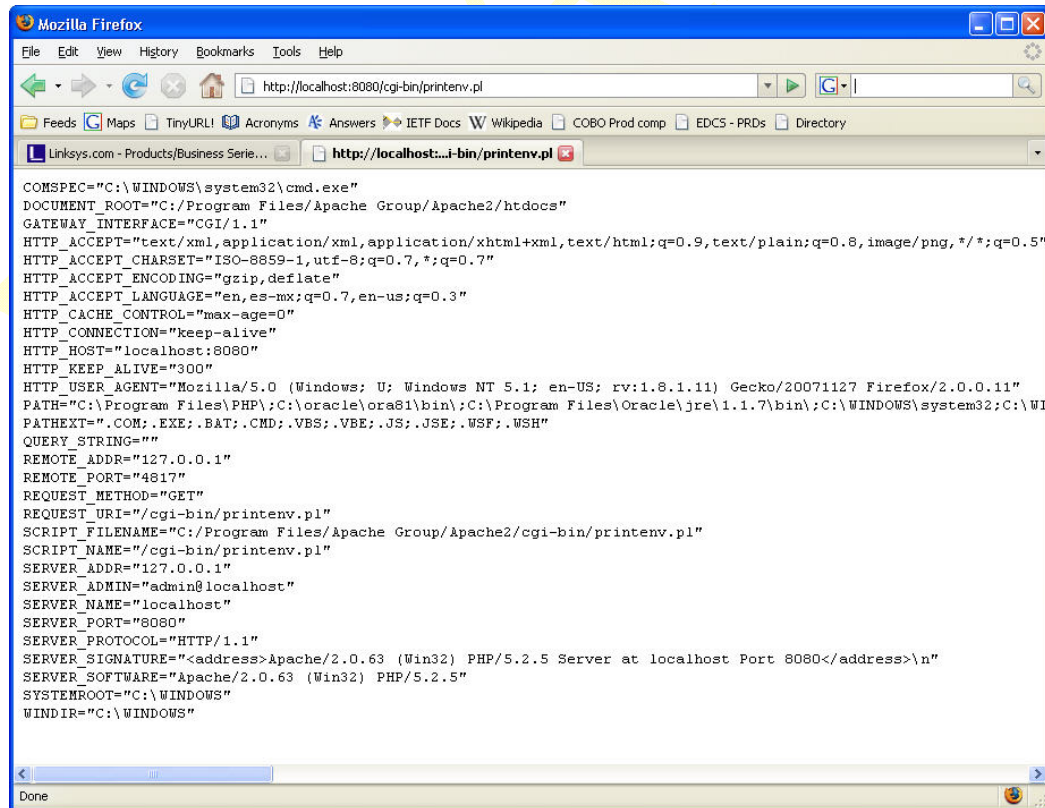
Binary build 822 [280952] provided by ActiveState http://www.ActiveState.com
Built Jul 31 2007 19:34:48

Perl may be copied only under the terms of either the Artistic License or the
GNU General Public License, which may be found in the Perl 5 source kit.

Complete documentation for Perl, including FAQ lists, should be found on
this system using "man perl" or "perldoc perl".  If you have access to the
Internet, point your browser at http://www.perl.org/, the Perl Home Page.

C:\>_
```

2. Directing your browser to the `http://localhost:8080/cgi-bin/printenv.pl` Perl script:



```
Mozilla Firefox
http://localhost:8080/cgi-bin/printenv.pl
Linksys.com - Products/Business Serie... http://localhost:8080/cgi-bin/printenv.pl
COMSPEC="C:\WINDOWS\system32\cmd.exe"
DOCUMENT_ROOT="C:/Program Files/Apache Group/Apache2/htdocs"
GATEWAY_INTERFACE="CGI/1.1"
HTTP_ACCEPT="text/xml,application/xml,application/xhtml+xml,text/html;q=0.9,text/plain;q=0.8,image/png,*/*;q=0.5"
HTTP_ACCEPT_CHARSET="ISO-8859-1,utf-8;q=0.7,*;q=0.7"
HTTP_ACCEPT_ENCODING="gzip,deflate"
HTTP_ACCEPT_LANGUAGE="en,es-mx;q=0.7,en-us;q=0.3"
HTTP_CACHE_CONTROL="max-age=0"
HTTP_CONNECTION="keep-alive"
HTTP_HOST="localhost:8080"
HTTP_KEEP_ALIVE="300"
HTTP_USER_AGENT="Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.8.1.11) Gecko/20071127 Firefox/2.0.0.11"
PATH="C:\Program Files\PHP\;C:\oracle\ora81\bin\;C:\Program Files\Oracle\jre1.1.7\bin\;C:\WINDOWS\system32;C:\WI
PATHEXT=".COM;.EXE;.BAT;.VBS;.VBE;.JS;.JSE;.WSF;.WSH"
QUERY_STRING=""
REMOTE_ADDR="127.0.0.1"
REMOTE_PORT="4817"
REQUEST_METHOD="GET"
REQUEST_URI="/cgi-bin/printenv.pl"
SCRIPT_FILENAME="C:/Program Files/Apache Group/Apache2/cgi-bin/printenv.pl"
SCRIPT_NAME="/cgi-bin/printenv.pl"
SERVER_ADDR="127.0.0.1"
SERVER_ADMIN="admin@localhost"
SERVER_NAME="localhost"
SERVER_PORT="8080"
SERVER_PROTOCOL="HTTP/1.1"
SERVER_SIGNATURE="<address>Apache/2.0.63 (Win32) PHP/5.2.5 Server at localhost Port 8080</address>\n"
SERVER_SOFTWARE="Apache/2.0.63 (Win32) PHP/5.2.5"
SYSTEMROOT="C:\WINDOWS"
WINDIR="C:\WINDOWS"
Done
```

Do not continue until you have confirmed your HTTP server is able to implement Perl and is responding to HTTP service requests.

## Installing PhoneDisplayRefresh\_multi-bit\_<name>.pl [Windows]

Ignore this section if you are using a UNIX HTTP server.

This section provides a sample Perl script to insert a REFRESH into the HTTP server's 200 responses. There are three tasks:

1. Edit the `httpd.conf` Apache2 configuration file
2. Edit the `PhoneDisplayRefresh_<number>-bit_<name>.pl` script in Apache2's `cgi-bin` directory
3. Restart the Apache2 server if you made changes to the `httpd.conf` file

### 1. Editing the Apache2 Configuration File [Windows]

Ignore this section if you are using a UNIX HTTP server.

Use an editor to open the `C:\Program Files\Apache Group\Apache2\conf\httpd.conf` file. As a best practice, consider using an editor suited for programming languages or scripting because they will not insert any hidden characters that could interfere with the intended behavior. The *Vim* editor, available from <http://www.vim.org> is an example of this type of editor.

Verify that the following entries are configured as you intended:

- `ServerRoot "C:/Program Files/Apache Group/Apache2"`  
[Path to match your system's]
- `Listen 192.168.2.14:8080`  
[IP address to match your system's]
- `LoadModule actions_module modules/mod_actions.so`  
[Inserts the refresh and makes photos/images available]
- `LoadModule mime_module modules/mod_mime.so`  
[Type module to associate bmp files a type]
- `ServerName 192.168.2.14:8080`  
[IP address and port to match your system's]
- `DocumentRoot "C:/Program Files/Apache Group/Apache2/htdocs"`
- `<Directory "C:/Program Files/Apache Group/Apache2/htdocs">`  
    `Allow from all </Directory>`  
    [Server's access control]
- `<Directory "C:/Program Files/Apache Group/Apache2/cgi-bin">`  
    `AllowOverride None`  
    `Options None`  
    `Order allow,deny`  
    `Allow from all`  
    `</Directory>`

### 2. Editing the PhoneDisplayRefresh\_<number>-bit\_<name>.pl Script [Windows]

Ignore this section if you are using a UNIX HTTP server.

Use an editor to create the Perl script files for the SPA962 and SPA942 phones:

- `C:\Program Files\Apache Group\Apache2\cgi-bin\PhoneDisplayRefresh_multi-bit_<name>.pl`
- `C:\Program Files\Apache Group\Apache2\cgi-bin\PhoneDisplayRefresh_one-bit_<name>.pl`

As a best practice, consider using an editor suited for programming languages or scripting because they will not insert any hidden characters that could interfere with the intended behavior. The *Vim* editor, available from <http://www.vim.org> is an example of this type of editor. Add the following to the `PhoneDisplayRefresh_<number>-bit_<name>.pl` file, adjusting color-depth (number), name (to

identify content), IP addresses, port numbers, and file names as appropriate for your environment. A sample of this file and test images are available on request.

```
#!\Perl\bin\perl.exe
# February 15 2008
# Linksys Connected Office Business Organization
# PhoneDisplayRefresh.pl
# Define an array of photographs
# Define an array of refresh times
# Present the photographs randomly to requesting phones
#
#
# Define names of photographs to use. These must be in single
# quotes and separated with a comma.
# SPA962 images must be exactly 320x240px in size
# SPA942 images must be exactly 128x48px and 1-bit color in size
my @pictures = ('photo01_962.bmp', 'photo02_962.bmp', 'photo03_962.bmp', 'photo04_962.bmp',
'photo05_962.bmp', 'photo06_962.bmp', 'photo07_962.bmp', 'photo08_962.bmp',
'photo09_962.bmp', 'photo10_962.bmp', 'photo11_962.bmp');
#
# Cause images on phones to refresh randomly
# every @timer seconds
my $picrandom = $pictures[rand @pictures];
my @timers = ('50','110','70','90');
my $timerandom = $timers[rand @timers];
#
# Send the phone a Refresh, a refresh time and tell the phone
# where to send the HTTP GET request, and call DisplayImage
print "Refresh: $timerandom;
url=http://192.168.2.14:8080/cgi-bin/PhoneDisplayRefresh_<size>-bit_<name>.pl\r\n";
&DisplayImage;
#
# This section sends the photograph to the phone for display
# The PATH definition is critical. Notice the \\ which are escaped
# backslashes to stop the \ from being interpreted
sub DisplayImage
{
$PATH="c:\\Program Files\\Apache Group\\Apache2\\htdocs\\images\\";
open IMG,"<$PATH\\$picrandom";
binmode IMG;
print "Content-type: Image/*\n\n";
binmode STDOUT;
while (<IMG>) {
print $_; # send photo to phone
}
close IMG;
exit (0); # Done
}# end of DisplayImage
```

This concludes the Windows HTTP server configuration. The next step is preparing background images.

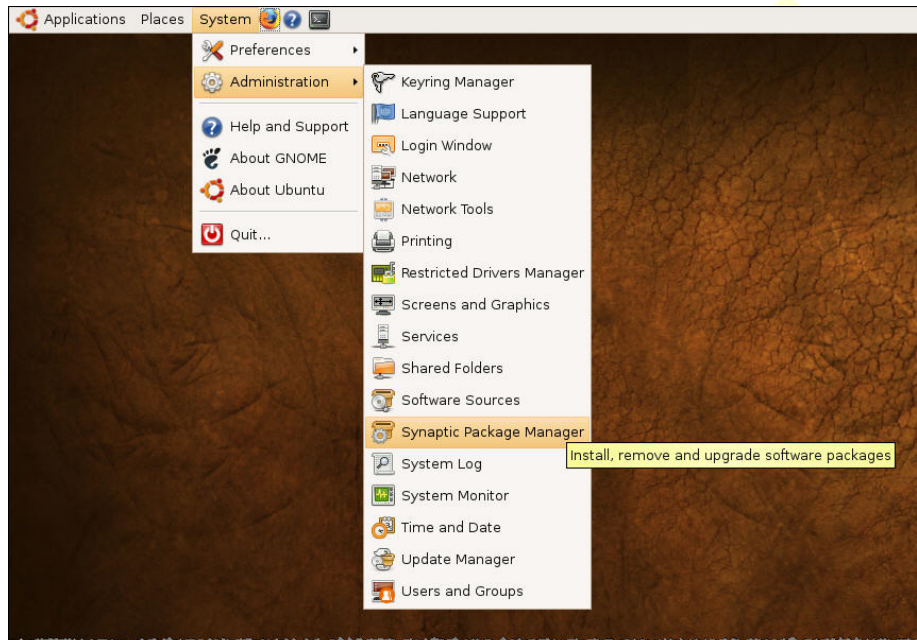
## Installing Apache2 Server and Perl [UNIX]

Ignore this section if you are using a Windows HTTP server.

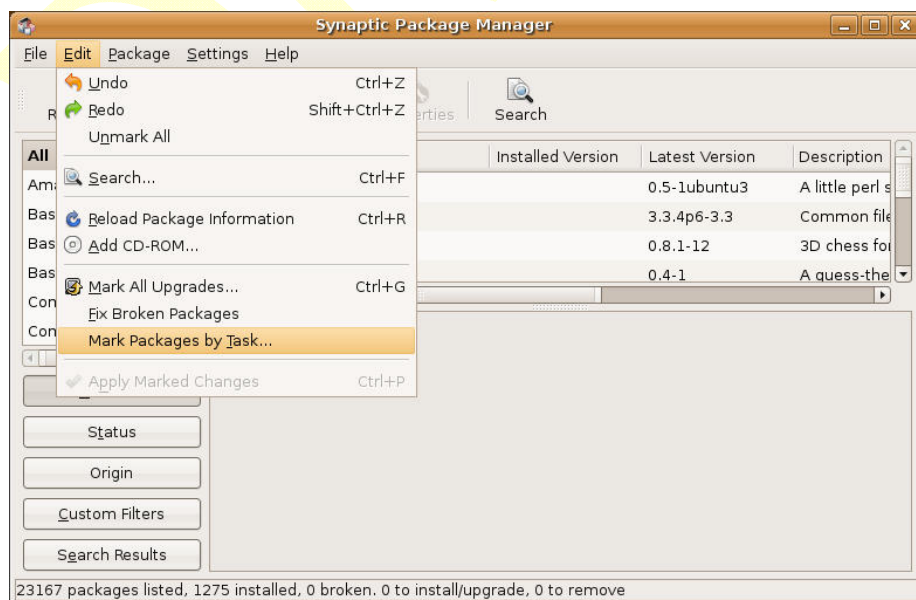
This document refers to the *Ubuntu 7.10 "The Gutsy Gibbon" of October 2007* UNIX. Ubuntu is available for free from the <http://www.ubuntu.com> site.

Install the LAMP Server which is a ready-made Linux/Apache/MySQL/PHP server (LAMP) as follows:

1. Start the Synaptic Package Manager [System > Administration > Synaptic Package Manager]  
`$ sudo synaptic`

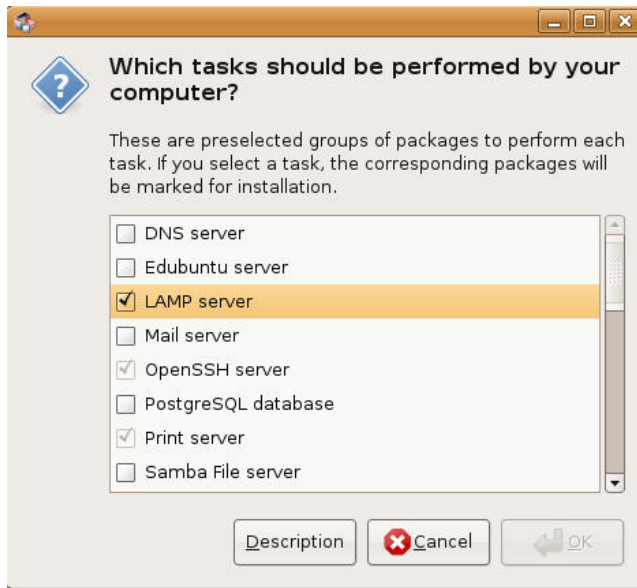


2. Click Edit > Mark Packages by Task

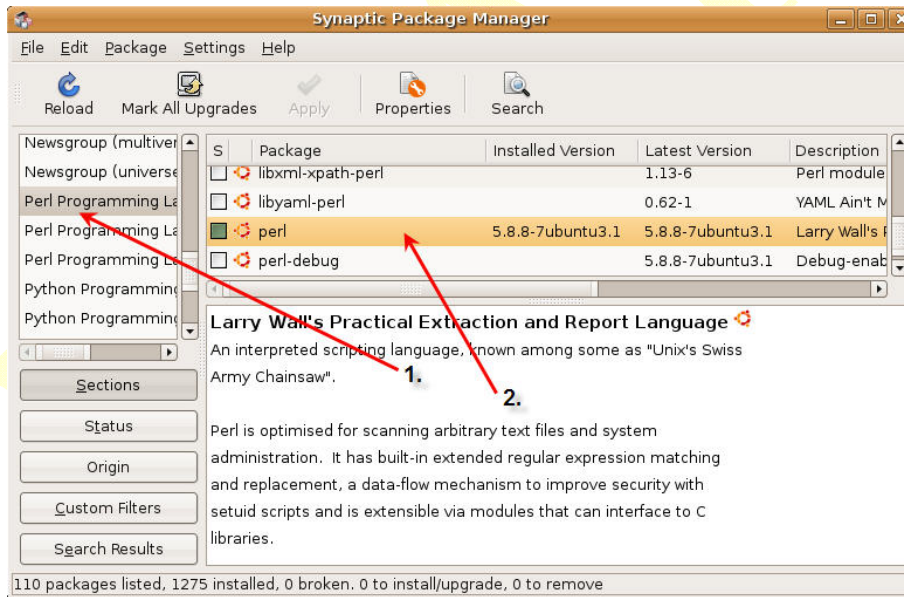




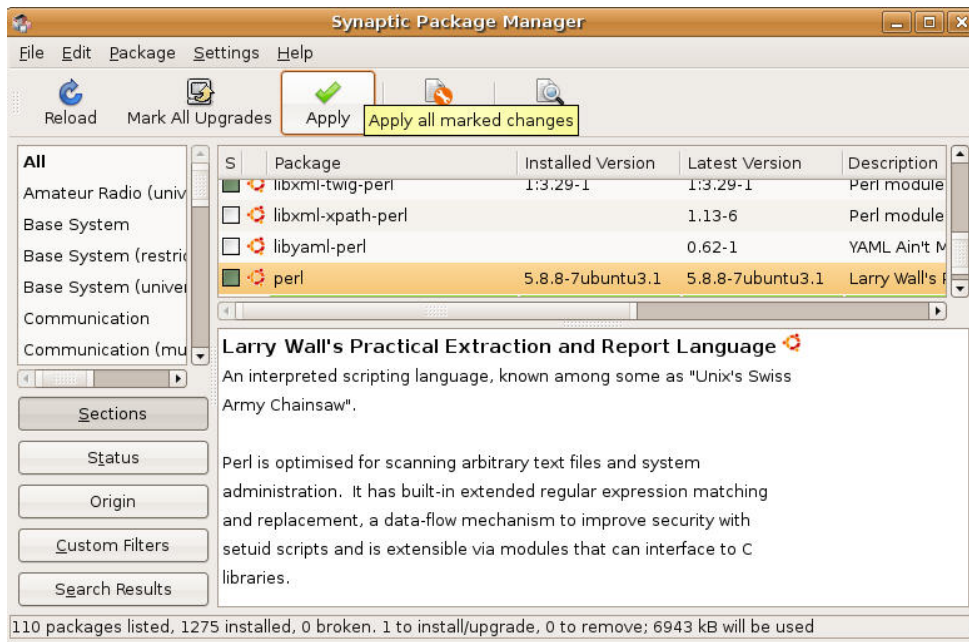
3. Select LAMP server



4. Click OK
5. In the top-left frame, scroll down to locate Perl Programming Language.
6. In the top-right frame, select perl 5.8.8-7ubuntu3.1 and mark for installation.



7. Click Apply to install LAMP and Perl.

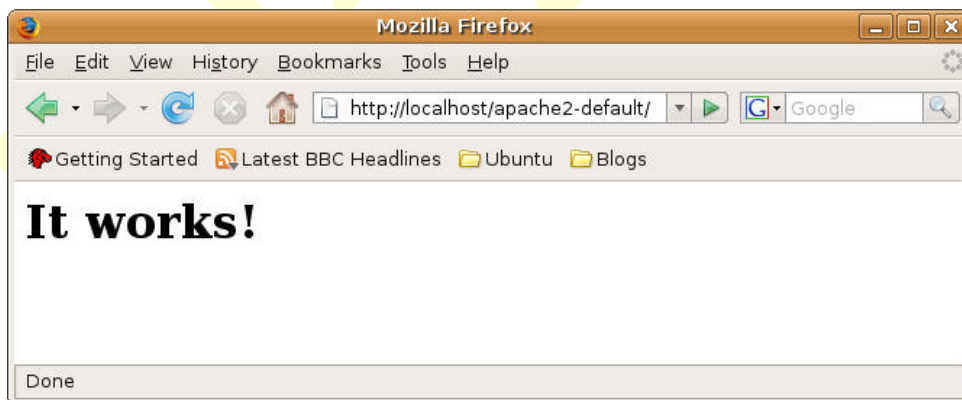


8. Click OK to install
9. Exit the Synaptic Package Manager once the installation has completed.

## Testing the Apache2 Installation [UNIX]

Ignore this section if you are using a Windows HTTP server.

Direct your browser to <http://localhost/apache2-default/> in order to verify that the HTTP server is properly operating. Do not continue until your HTTP server is functional.



## Installing PhoneDisplayRefresh.pl [UNIX]

Ignore this section if you are using a Windows HTTP server.

This section provides a sample Perl script to insert a REFRESH into the HTTP server's 200 responses. There are three tasks:

1. Edit the `httpd.conf` Apache2 configuration file
2. Edit the `PhoneDisplayRefresh_<number>-bit_<name>.pl` script in Apache2's `cgi-bin` directory
3. Restart the Apache2 server



## Editing the Apache2 Configuration File [UNIX]

Ignore this section if you are using a Windows HTTP server.

Open the `/etc/apache2/apache2.conf` file with your favorite editor.

```
$ sudo vim /etc/apache2/apache2.conf
```

Verify that the following entries are configured as you intended:

- `ServerRoot "/etc/apache2"`  
[Path to match your system's]
- `Include /etc/apache2/httpd.conf`  
[Enable user configuration]

## Editing the PhoneDisplayRefresh\_<name>.pl Script [UNIX]

Ignore this section if you are using a Windows HTTP server.

1. Create the `/usr/lib/cgi-bin/PhoneDisplayRefresh_<number>-bit_<name>.pl` file with your favorite editor. Add the following to the `PhoneDisplayRefresh_<name>.pl` file, adjusting IP addresses, port numbers, and file names as appropriate for your environment. A sample of this file and test images are available on request.

```
$ sudo vi /usr/lib/cgi-bin/PhoneDisplayRefresh.pl
#!/usr/bin/perl
# February 12 2008
# Linksys Connected Office Business Organization
# PhoneDisplayRefresh.pl
# Define an array of photographs
# Define an array of refresh times
# Present the photographs randomly to requesting phones
#
#
# Define names of photographs to use. These must be in single
# quotes and separated with a comma. SPA962 images must be exactly
# 320x240px in size
my @pictures = ('photo01_962.bmp', 'photo02_962.bmp', 'photo03_962.bmp',
'photo04_962.bmp', 'photo05_962.bmp', 'photo06_962.bmp', 'photo07_962.bmp',
'photo08_962.bmp', 'photo09_962.bmp', 'photo10_962.bmp', 'photo11_962.bmp');
#
# Cause images on phones to refresh randomly
# every @timer seconds
my $picrandom = $pictures[rand @pictures];
my @timers = ('50','110','70','90');
my $timerandom = $timers[rand @timers];
#
# Send the phone a Refresh, a refresh time and tell the phone
# where to send the HTTP GET request, and call DisplayImage
print "Refresh: $timerandom;
url=http://192.168.2.10/cgi-bin/PhoneDisplayRefresh_<size>-bit_<name>.pl\r\n";
&DisplayImage;
#
# This section sends the photograph to the phone for display
# The PATH definition is critical. Notice the \\ which are escaped
# backslashes to stop the \ from being interpreted
sub DisplayImage
{
    $PATH="/var/www/images/";
    open IMG,"<$PATH/$picrandom";
    binmode IMG;
    print "Content-type: Image/*\n\n";
    binmode STDOUT;
    while (<IMG>) {
        print $_; # send photo to phone
    }
    close IMG;
}
```

```
    exit (0); # Done
}# end of DisplayImage
```

2. Assign the file execute permissions:

```
$ sudo chmod 755 PhoneDisplayRefresh.pl
```

3. Restart the Apache2 server

```
$ sudo /etc/init.d/apache2 restart
```

```
* Restarting web server apache2
apache2: Could not reliably determine the server's fully qualified domain name, using
127.0.1.1 for ServerName
apache2: Could not reliably determine the server's fully qualified domain name, using
127.0.1.1 for ServerName
```

```
[ OK ]
```

```
$
```

This concludes the UNIX HTTP server configuration. The next step is preparing background images.

DRAFT

# Preparing Background Images

This section provides suggestions for background images. Considerations include image format, dimensions, naming convention, and building an image library. This document describes installing images in the `images` directory on the HTTP server.

## Image Format

The LVS phone displays require images in bitmap (\*.bmp) format. Any other image formats are not compatible and will be silently ignored by the phones.

## Image Dimensions

The background image must be sized appropriately for the target LVS phone type.

- SPA962--320 pixels wide, 240 pixels high, and 1, 4, 8, 24, or 32-bit color.
- SPA942--128 pixels wide, 48 pixels high, and 1-bit color.

Any other image dimension will be silently ignored by the LVS phone.

## Image Naming

As a best practice, using generic image names will allow you to more efficiently update and identify the background images. [UNIX: images must be readable: `$ sudo chmod 444 *.bmp`]

This paper uses the following conventions:

- SPA962 – image1\_962.bmp, image2\_962.bmp, image3\_962.bmp... ..
- SPA942 – image1\_942.bmp, image2\_942.bmp, image3\_942.bmp ... ..

## Image Quantity

This document's configuration will describe an image library that contains 11 images formatted for SPA962 phones. The image names must be pre-declared in the HTTP server's script.

## Image Considerations

Your favorite photographs and images may not provide the impact that you expect unless you account for status lines and line key labels obscuring parts of the display when cropping your images. When in screen-saver mode, the key labels on the right and on the bottom are not displayed, but the status line information at the top becomes screen saver information and continues to obscure part of the background image.

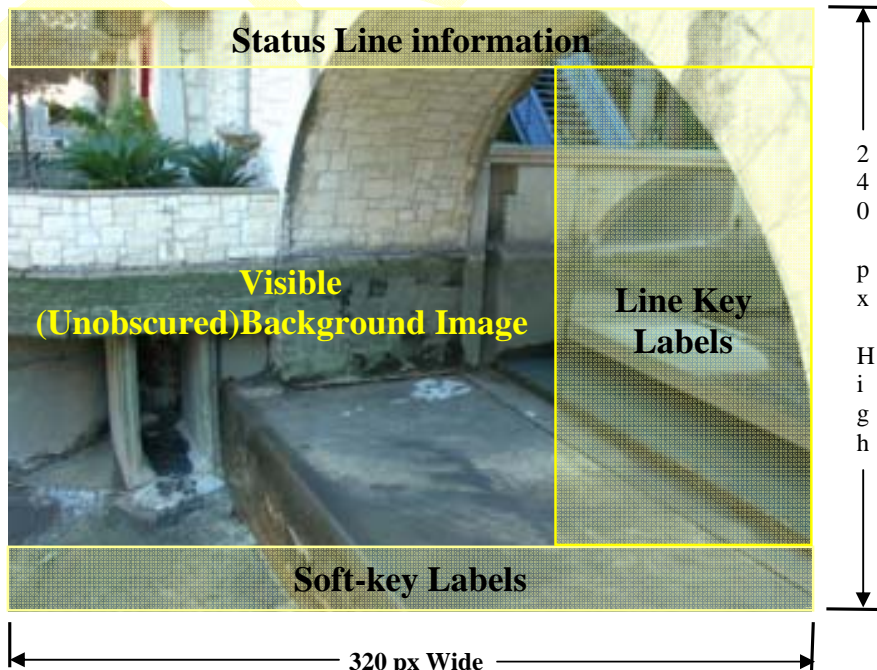


Figure 2: Background Image Obstructions when phone is in operation

# Configuring a SPA962's Background Picture

The final step in the process is configuring the phone as follows:

1. Direct a browser to the target phone's configuration page.

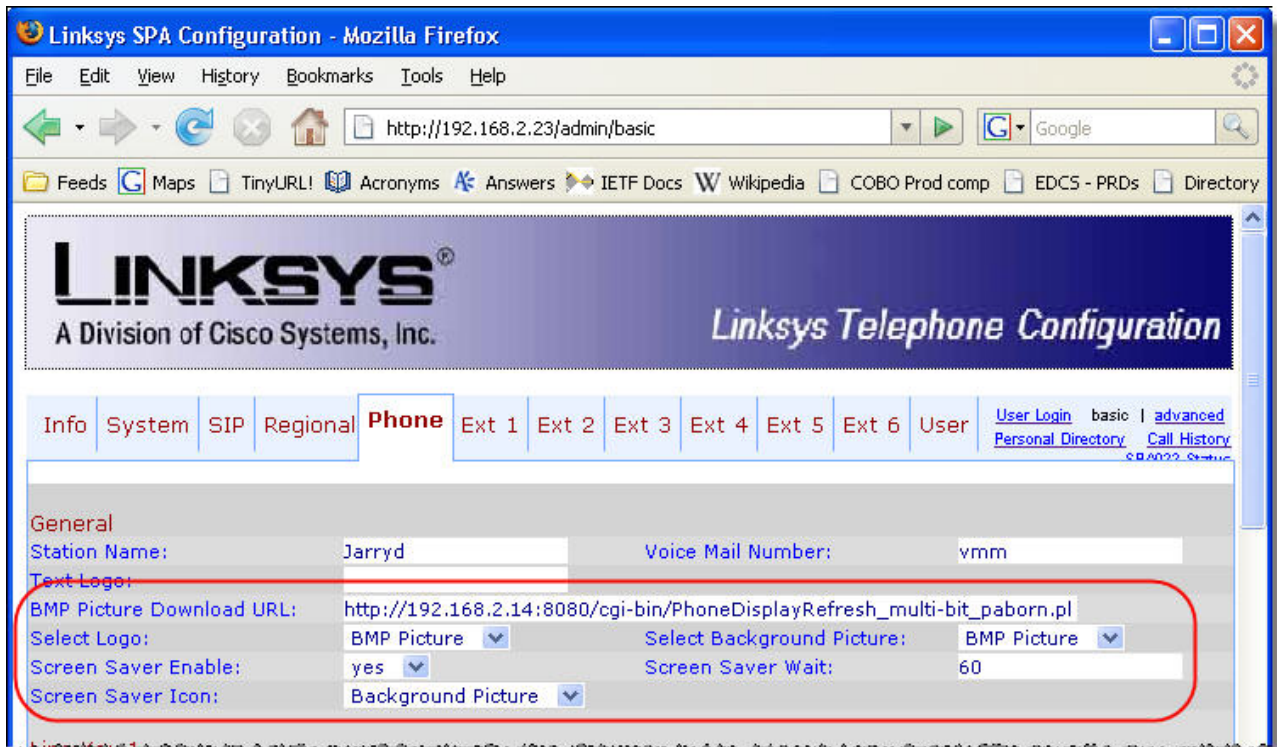


Figure 3: SPA962 Background Image Configuration

2. Insert the URL for the HTTP server.
3. Change Select Logo to BMP Picture. [Optional, not required]
4. Change Screen Saver Enable to BMP Picture. [Optional, not required]
5. Change Screen Saver Icon to Background Picture. [Optional, not required]
6. Change Select Background Picture to BMP Picture.
7. Adjust Screen Saver Wait time to suit. [Optional, not required]
8. Click Submit All Changes.
9. Reboot the phone by directing your browser to:  
**http://192.168.2.23/admin/reboot**

The phone will reboot and display a random image defined in the *my @pictures* array. The phone will request another image once the refresh timer expires. The server will supply a random image and a new random refresh timer.

## Configuring a SPA942's Background Picture

The final step in the process is configuring the phone as follows:

1. Direct a browser to the target phone's configuration page.

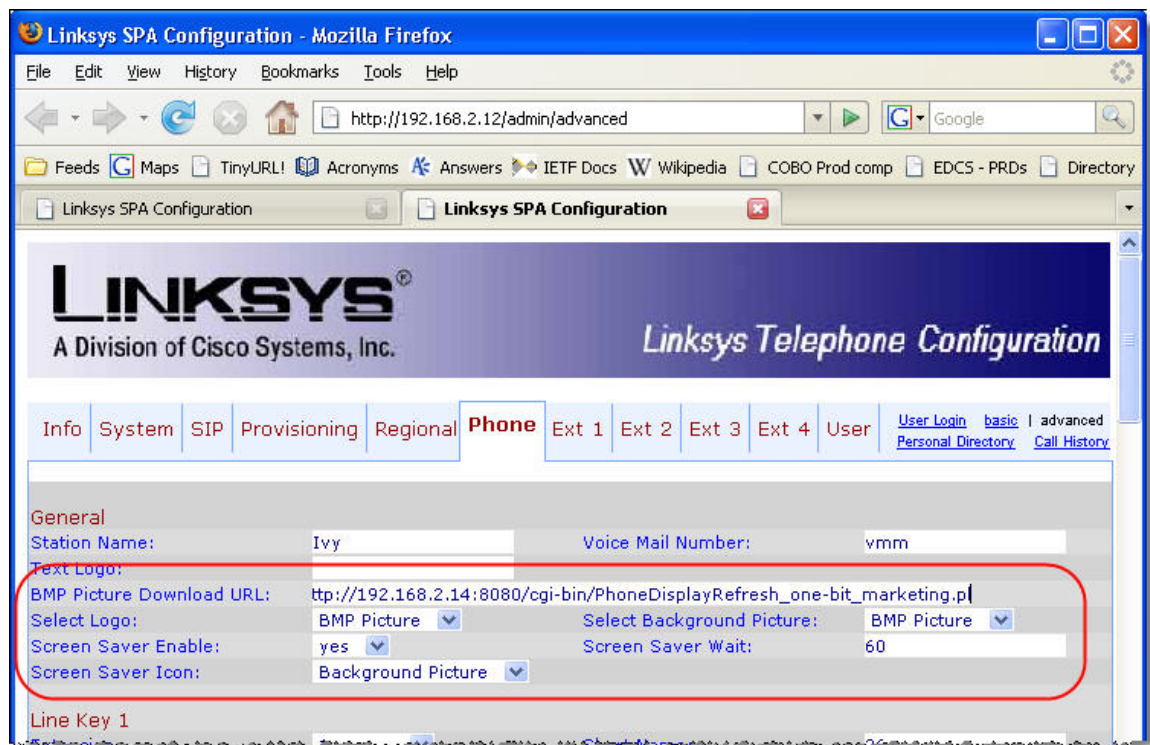


Figure 4: SPA942 Background Image Configuration

2. Insert the URL for the HTTP server.
3. Change Select Logo to BMP Picture. [Optional, not required]
4. Change Screen Saver Enable to BMP Picture. [Optional, not required]
5. Change Screen Saver Icon to Background Picture. [Optional, not required]
6. Change Select Background Picture to BMP Picture.
7. Adjust Screen Saver Wait time to suit. [Optional, not required]
8. Click Submit All Changes.
9. Reboot the phone by directing your browser to:  
**`http://192.168.2.12/admin/reboot`**

The phone will reboot and display a random image defined in the `my @pictures` array. The phone will request another image once the refresh timer expires. The server will supply a random image and a new random refresh timer.



# Troubleshooting

## Common Problems

### Background picture was changing, now the same image is constantly displayed:

- The phone will not request a new image if does not receive a response from the HTTP server. The server could be down, or may not be able to serve an image for any number of reasons.

**Solution:** Reboot the phone with `http://<IP_address_of_phone>/admin/reboot`

View the C:\Program Files\Apache Group\Apache2\logs\access.log log file

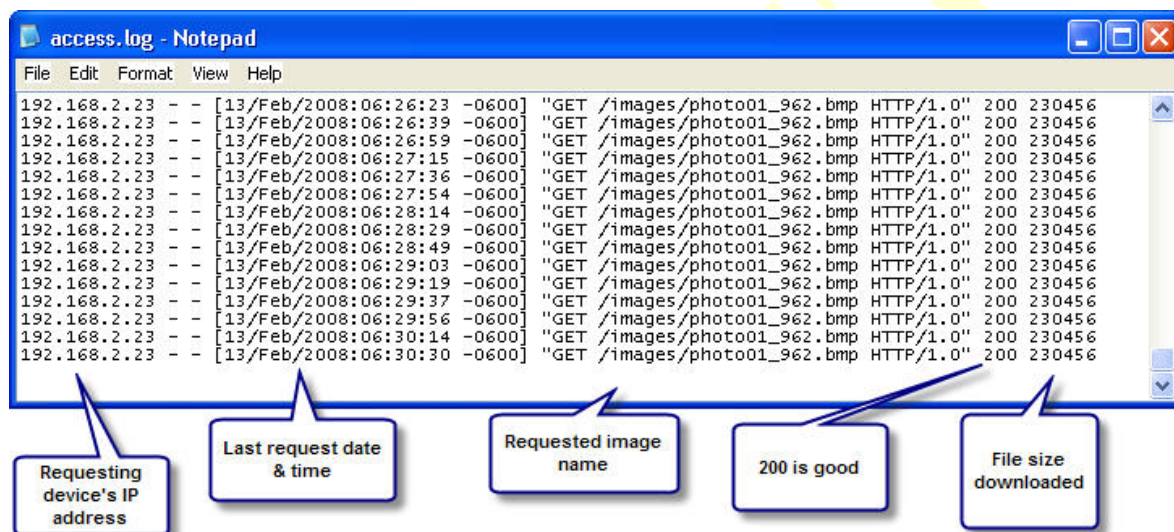


Figure 4: Apache2 access log example [Windows]

**Note:** Your log file will show "GET /cgi-bin/PhoneDisplayRefresh\_<number>-bit\_<name>.pl HTTP/1.0"  
For example: "GET /cgi-bin/PhoneDisplayRefresh\_multi-bit\_paborn.pl HTTP/1.0"

View the /var/log/apache2/access.log log file

`$ tail -f /var/log/apache2/access.log`

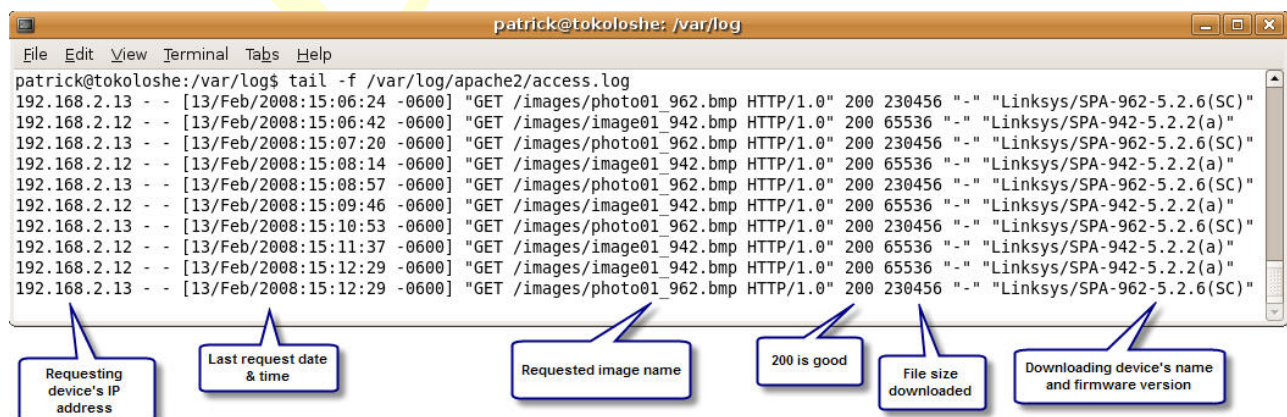


Figure 4: Apache2 access log example [UNIX]

**Note:** Your log file will show "GET /cgi-bin/PhoneDisplayRefresh\_<number>-bit\_<name>.pl HTTP/1.0"  
For example: "GET /cgi-bin/PhoneDisplayRefresh\_multi-bit\_paborn.pl HTTP/1.0"

- Following is an example of access log error, notice the 404, indicating file not found:  
192.168.2.23 - - [13/Feb/2008:05:18:29 -0600] "GET /images/photo07\_962.bmp HTTP/1.0" 404 309
- View the Apache2 access log file and verify, by looking at the bottom of the log, that:
  - **The phone's IP address has recently requested an image**  
If not:
    1. Verify the server's IP address on the phone at:  
Phone > General > BMP Picture Download URL
    2. Use the Windows Task Manager to verify that the Apache2 server processes are running  
[UNIX: `ps aux | grep apache`]
  - **A valid image name was requested**  
If not:
    1. Edit the my @pictures array in the  
C:\Program Files\Apache Group\Apache2\cgi-bin\  
PhoneDisplayRefresh\_<number>-bit\_<name>.pl file  
[UNIX: `/usr/lib/cgi-bin/PhoneDisplayRefresh_<number>-bit_<name>.pl`]
    2. Reboot the phone with `http://<IP_address_of_phone>/admin/reboot`
  - **The HTTP server responded with 200**  
If not:
    1. If 404, indicates that image was moved out, perhaps by someone performing photo maintenance. Verify that the requested image name is located in the images directory.  
[If UNIX, must have read permissions: `sudo chmod 444 *.bmp`]
    2. A 5xx error indicates a possible syntax error in the  
cgi-bin\PhoneDisplayRefresh\_<number>-bit\_<name>.pl file
  - **The served file size is correct**  
If file size is - but the server response is 200:  
Correct the \$PATH statement in the  
cgi-bin\PhoneDisplayRefresh\_<number>-bit\_<name>.pl file
- View the C:\Program Files\Apache Group\Apache2\logs\error.log file and look for *File does not exist* messages:  
[UNIX: `/var/log/apache2/error..log`]

```
[Wed Feb 13 05:18:29 2008] [error] [client 192.168.2.23] File does not exist: C:/Program Files/Apache Group/Apache2/htdocs/images/photo07_962.bmp
```

Verify that the requested file exists

[If UNIX, must have read permissions: `$ sudo chmod 444 *.bmp`]

The phone makes only one request for an image. Reboot the phone with

`http://<IP_address_of_phone>/admin/reboot`

## Background picture never changed:

- View the C:\Program Files\Apache Group\Apache2\logs\error.log  
[UNIX: `/var/log/apache2/error.log`]  
Apache2 access log file and verify, by looking at the bottom of the log, that:
  - The Apache2 server has started:  
[Wed Feb 13 05:06:49 2008] [notice] Server built: Jan 17 2008 22:58:29  
[Wed Feb 13 05:06:49 2008] [notice] Parent: Created child process 17052  
[Wed Feb 13 05:06:49 2008] [notice] Child 17052: Child process is running  
[Wed Feb 13 05:06:49 2008] [notice] Child 17052: Acquired the start mutex.  
[Wed Feb 13 05:06:49 2008] [notice] Child 17052: Starting 250 worker threads.  
If not:
  1. Remove syntax errors from the  
C:\Program Files\Apache Group\Apache2\conf\httpd.conf  
configuration file.  
[UNIX: `/etc/apache2/httpd.conf` ]



- Test access with browser. Direct your browser to the same URL that your phone requests images from. Verify that the image displays in the browser. If the browser is unable to retrieve the image, the phone will not be able to retrieve the image either.

## Technical Assistance

Linksys provides this Application Note as a starting point for configuring background picture refreshes for SPA962 phones. Linksys does not provide support for configuring Windows or UNIX servers.

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