EN/LZTBP 150 105 R1A

August 2002

WHITE PAPER

How To Create Colored WAP Pages

Picture Enhancement For Different Device Display Types

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Preface

To ensure that content is displayed correctly and attractively on most popular WAP devices, the content in form of text and pictures needs to be formatted accordingly. This document is intended to serve companies as a guideline to work with the most frequently used WAP devices from Sony Ericsson, Nokia, Siemens and Motorola, and most WAP gateways currently in use in Europe.

More information about formatting content for specific devices can be obtained from the WAP device manufacturers.

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1 Pictures

Pictures typically need to be scaled down to a suitable size and bit depth to display nicely on a phone. It is possible to prepare macros that perform a decent transformation of good quality originals, but best results are achieved by hand.

1.1 Picture Sizes

To ensure that pictures fit on the screen, yet use the most of the devices' capabilities, refer to the table below for suitable picture sizes.

Picture type	Recommended sizes
Color screensaver (Ericsson T68)	101 x 80 pixels
Color inline illustration image, not-clickable	101 x 7, 101 x 17, 101 x 27, 101 x 37, 101 x 47
Color inline illustration image, clickable	97 x 7, 97 x 17, 97 x 27, 97 x 37, 97 x 47
Greyscale screensaver (Ericsson T65, R520 / T39)	73 x 39 / 73 x 26
Greyscale inline illustration image, not-clickable	101 x 7, 101 x 17, 101 x 27, 101 x 37
Greyscale inline illustration image, clickable	97 x 7, 97 x 17, 97 x 27, 97 x 37
Black & white screensaver (Nokia)	72 x 28
Black & white inline illustration image, not-clickable	84x30 (3330, 8310), 96x40 (Others)
Black & white inline illustration image, clickable	82x30 (3330, 8310), 94x40 (Others)

From the above table, it is clear that you can get away with using pictures that are all the same size:

96 x 37 Pixel will work with almost all phones.

Format: color, greyscales and black & white

84 x 30 Pixel for NOKIA 3330 and 8310 models

Format: black & white

Different scenarios might happen:

a) your application is “simple” in image presentation and you would like to use one picture for all devices: See “1 version neded” below.

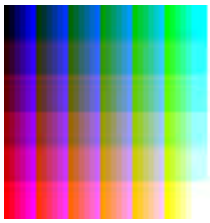
b) You would like to adapt your output to different client types, e.g. by parsing the user agent environment variable: We recommend the other image types below.

Number of versions needed	Recommended image types
1	84x30, black & white
2	84x30 b&w, 97x37 color
3	84x30 b&w, 96x37 b&w, color
4	84x30 b&w, 97x37 b&w, greyscales, color

1.2 Color Pictures

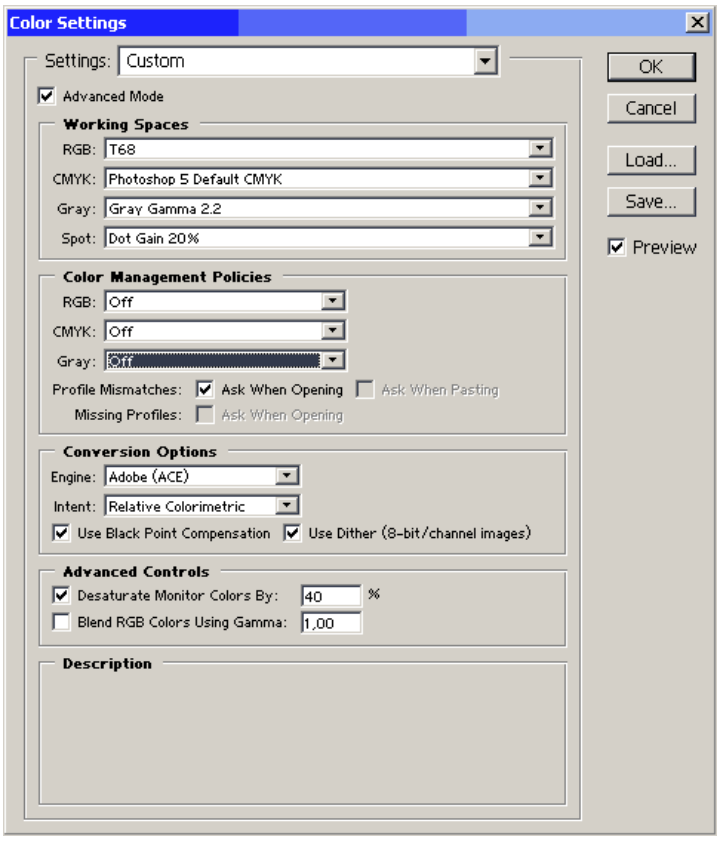
1.2.1 General Tips

- Mobile color devices can typically show 256 colors
- High-end devices typically support more colors, but then normally also offer full HTML browsing functions.
- Most color devices have a 3-bit Red, 3-bit Green, 2-Bit Blue palette -> Avoid pictures with large blue gradients, as these will become grainy.
- Ensure that you use the RGB 3-3-2 color GIF palette on your computer. Check with your image manipulation application (e.g. Adobe Photoshop which is used as the reference tool in the following sections) for further documentation on how this palette can be set up.
- Ensure that your phone's display contrast is well calibrated. In case of Sony Ericsson T68 this can be done by sending a 256 color test image to the phone using infrared, bluetooth or via WAP, and setting the display contrast to a level where all color levels in the test picture look equidistant. A 256 color test picture can look like this:



- Adaptations within Adobe Photoshop are as follows: “Edit->Color Settings-> (have “Advanced Mode” on) De-saturate Monitor colors by: 40%”.
- Now ensure that your computer screen is calibrated towards the (previously calibrated) color phone. This can be achieved by adjusting color settings, gamma levels etc. in Adobe PhotoShop until the test image looks identical on the computer and the phone: Edit->Color Settings->Working Spaces: RGB->Custom RGB...

- A typical setup could look like this:



1.2.2 Preparing Color Pictures in Adobe Photoshop

- Resize and crop the image to the right size and proportions.
- Adjust levels and contrast in RGB-mode. The picture should be exaggeratedly sharp. If it is not the case, apply the sharpen filter. In case you want to put a focus on a part of the picture, use the lasso- (or other selection) tool and select that part. Use the sharpen filter just on this selected part. Now inverse the selection and use the “blur”-Filter on the rest of the picture. Since the computer screen is now displaying the picture with the same low saturation as the device, normally the picture will initially look rather grey, and will require maximum saturation to look ok.
- Choose “Image->Mode->Indexed colors” and use (Load... if necessary) the custom 3-3-2 palette together with dither: diffusion/none, 10-100%. For cartoons or graphics, use low dither levels, and for photographs use dither levels around 70-100%.
- Choose “Save For Web”. Use the custom palette here as well, but set the number of colors to "Auto" to reduce file size.
- Ensure by reducing the number of colors or dither percentage that the picture file size does not exceed approx. 2720 Bytes, or it will not pass

the older WAP gateways that many network operators still today provide.

- JPEG images can also be interpreted by the Sony Ericsson T68 WAP browser. Please note though that the color interpretation is still limited to 256 colors on the device.

Attention - Important: Picture file size below 2720 Bytes !!

1.3 Greyscale

1.3.1 General

- Greyscale devices typically support 4 or 16 uniform greys.
- Ensure that you have the appropriate greyscale color palette on your computer reflecting the grey scale levels from black to white.

1.3.2 Preparing Greyscale Pictures in Adobe PhotoShop

- Resize and crop the image to the right size and proportions.
- Adjust levels and contrast in RGB-mode. The picture should be exaggeratedly sharp. You might want to apply the sharpen filter. In case you want to put a focus on a part of the picture, use the lasso-tool and select the part. Use the sharpen filter just on this selected part. Now inverse the selection and use the blur filter on the rest of the picture.
- Choose “Image->Mode->Grayscale”. From the “Image->Adjust” menu, now apply "Auto-contrast", "Auto-levels" and finally "Equalize". The purpose of this manoeuvre is to ensure that the each of the greyscale levels is used for an equally large portion of the image. Many images will otherwise become, say almost completely dark grey, while hardly using the black, white and light grey levels at all.
- Choose “Image->Mode->RGB”, and then directly “Image->Mode->Indexed” colors and use (resp. load... if necessary) the custom greyscale palette together with dither: diffusion/none, 10-100%. For cartoons or graphics, use low dither levels, and for photographs use dither levels around 70-100%.
- Choose Save for web. Now double-click on each of the four colors in the color table and push enter. (This is due to a bug in Adobe Photoshop and might be depending on the version you use).

Tip: Greyscale pictures should be smaller than 1,0 kB.

1.4 Black & White

1.4.1 General

Mobile devices only being capable of displaying Black & white images are still very common. Depending on the target group for your application, you might want to consider availability of pictures and follow the next steps.

Ensure that you have the Adobe Photoshop wbmp-Plug-In on your computer. (e.g. the “Unwired” wbm output filter can be downloaded freely from different sources on the internet).

1.4.2 Preparing Black & White Pictures in Adobe PhotoShop

- Resize and crop the image to the right size and proportions for the target device.
- Adjust levels and contrast in RGB-mode or Greyscale-mode. The picture should be exaggeratedly sharp. If it is not, use the sharpen filter.
- Choose “Image->Mode->Indexed” colors and select a 2-color (black & white) uniform palette together with dither: diffusion/none, 10-100%. For cartoons or graphics, use low dither levels, and for photographs use dither levels around 70-100%.
- Choose “Image->Mode->Grayscale” and then select “Image->Mode->Bitmap”. Now save the pictures by “save as” and choose the format "UnWired" (The required "UnWired" plug-in for PhotoShop is available as a free download on the Web.)
- Now rename the picture manually and add a “p” at the end of the name. Example: “picture1.wbm” -> “picture1.wbmp”.

1.5 Pixel Stretch

Many low-end devices still use displays with non-quadratic pixels. The pixel stretch (width-height) is normally between 1,0-1,0 to 1,0-1,25.

For cost-efficiency reasons, we disregard the pixel stretch for the time being, since pixel stretch – compensation requires positively identifying the end-user's device and dynamically adapting the content which would be outside the scope of this document.

2 Layout Issues

2.1 Tables

The interpretation of the <table> tag is supported by most of the devices currently available on the market but resulting output (i.e. border handling and cell padding widths) vary significantly from device to device.

We do recommend to limit the presentation of columns to maximum of 2 in order to avoide horizontal scrolling of tables.

3 Slideshows

3.1 General Issues

With the introduction of WAP version 1.1, the implementation of slideshow effects by using the <timer> tag enhances the user experience and convenience e.g. less need for manual scolling. Example:

```
<?xml version="1.0"?>
<!DOCTYPE wml PUBLIC "-//WAPFORUM//DTD WML 1.2//EN"
"http://www.wapforum.org/DTD/wml12.dtd">

<wml>
        <card id="page1" ontimer="main.wml" title="Welcome!">
            <timer value="40"/><p align="center"><img src="welcome.gif" width="73"
height="27" alt="Welcome"/><br/>
            </p>
        </card>
</wml>
```

3.2 Frame Rate

The image loading time depends severely on the available bandwidth as provided by the network operator. A typical picture loading time between 2-7 seconds is normal.

3.3 Alternate Text Presentation

Descriptive texts of images such as <img alt=”welcome” ….> are mostly loaded ahead of the image presentation and thus visible for the user while the image is loading. It is strongly recommended to use this description in a meaningful context to the picture for richer user experience.

4 Naming Convention

When preparing large numbers of pictures, all pictures should be named according to a suitable naming convention, to allow storing all images in the same directory. Which specific convention to use is not important, as long as it is good and used consistently.

The following convention has been successfully used in previous projects:

Format color (.gif)

IMAGENAME_col_IMAGETYPE_IMAGESERIAL.gif

Format greyscale (.gif)

IMAGENAME_gr_IMAGETYPE_IMAGESERIAL.gif

Format black & white (.wbmp)

IMAGENAME_bw_IMAGETYPE_IMAGESERIAL.wbmp

IMAGETYPE and IMAGESERIAL reflect categories resp. numbering schemes you might want to use, such as e.g. SENDSMS_col_SERVICE_027.gif etc.

5 Examples

Appearance in Sony Ericsson t68i:

1053 byte GIF

2696 byte GIF

2.674 byte GIF

2.613 byte GIF

The samples shown are taken from the mobile movie portal
http://wap.film-mobile.com/

powered by Ericsson.

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6 References

Official WAP documentation:

http://www.wapforum.org/what/technical.htm

Ericsson WAP documentation, see “Open Zone” at:

http://www.ericsson.com/mobilityworld/

Sony Ericsson product and service information:

http://www.sonyericsson.com/

T68 color profiles for Adobe Photoshop:

http://www.ericsson.de/mobilityworld/

Motorola WAP documentation

http://developers.motorola.com/developers/wireless/documentation/#wap

Nokia WAP documentation

http://www.forum.nokia.com/main/1,6668,21,00.html#1978

Colored WAP emulator

http://www.wapsilon.com/PDA/

UnWired WBMP Plug-In for Adobe Photoshop

http://www.rcp.co.uk/

Samples and Tools for Sony Ericsson T68i

http://www.christersson.org/

http://www.esato.com/

Image Manipulation for Web Sites running PHP

http://www.php.net/manual/en/ref.image.php

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