



Icons and Frames

BMP file format

TC5740

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1 Purpose

This document describes the BMP file format that will best fit the OSD implementation on TransChip's CMOS sensors 57xx and above.

The graphic designer of the icons and frames (borders) should read this document in order to create icons that will best fit and can be easily converted into a "C header" file that will eventually be compiled together in the "Icons and Frames Database" with the TC SDK.

2 Definitions/ Terms

- **TC SDK** – TransChip Software Developer Kit. ANSI C Source files to be compiled on the BB (base band) that allows interfacing with the camera.
- **BB** – Base Band. The platform processor or microcontroller.
- **OSD** – On Screen Display. Icons and frames that overlay the live video stream.
- **Region** – Area within the preview window that is defined by X,Y coordinates together with width and height.
- **Palette** – list of colors that the icon or frame uses. The icon or frame pixels are essentially indices into this list.

3 Applicable Documents

- TC57xx datasheet.
- TC57xx Programmer reference.

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4 BMP – 16 colors – 4 bit per pixel

The BMP file format that will best fit OSD and will require minimum conversion effort is a windows bit map file (BMP) that is saved as 4 bit per pixel (i.e. 16 colors). The color palette is saved by the graphic editing SW (e.g. paint shop pro) embedded in the windows BMP file header. Each color in the palette is saved as RGB888 (i.e. 24 bit).

The OSD HW allows such bit map to overlay a live preview image and in order to allow transparent pixels in the bit map, index 0 was reserved. Thus, essentially we are left with 15 colors. (See example)

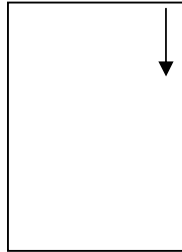
5 Rotation and vertical flip

Usually when integrating a VGA camera in a cell phone we recommend to rotate the camera (physically) in 90°. The reason for that is to get a maximum field of view.

Consider a cell phone with an LCD of 120x160:

The Camera output is VGA (640x480) and could be down-sampled by 4 (QQVGA = 160x120).

Only if we rotate the camera it will perfectly fit the LCD given the fact that the LCD setting should be for vertical scanning instead of horizontal scanning (its default). To prevent a mirror affect the LCD scanning should start from the top right corner:



Since the camera is now rotated by 90° All OSD images (icons and frames) should also be rotated. According to the recommendations and to allow the scanning of the LCD from top right corner, the camera should be rotated 90° right if you look behind the camera (through the eyes of the camera). Hence the BMP image that will be used as OSD should be rotated 90° left so after the rotation to the right it will be straight up.

After the rotation of the image to the left we need to vertically flip it because the BMP file stores the last line first.

6 Example

6.1 Rotation and vertical flip

Consider the following icon needs to be modified to best fit the camera OSD constrains:



This icon needs to be rotated 90° left:



and flipped:

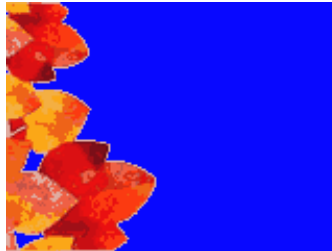


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6.2 Transparent pixel.

As explained before, the image overlay is done by the use of special color index that is preserved for transparency. This transparent pixel is always index 0 in the 16 colors palette which eventually leaves us with 15 colors to use.

For example the following frame (after rotation and flip):



Uses the following palette:



Notice the fact that index 0 in the palette (the blue color) will be ignored when the OSD will process this bit map.

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