NAME

MIFF - Magick Image File Format is a platform-independent format for storing bitmap images. MIFF is a part of the ImageMagick toolkit of image manipulation utilities for the X Window System. ImageMagick is capable of converting many different image file formats to and from MIFF (e.g. JPEG, XPM, TIFF, etc.).

SYNOPSIS

#include <image.h>

DESCRIPTION

A MIFF image file consist of two sections. The first section is a header composed of keywords describing the image in text form. The next section is the binary image data. The header is separated from the image data by a **:** character immediately followed by a **newline**.

The MIFF header is composed entirely of LATIN-1 characters. The fields in the header are keyword and value combination in the *keyword=value* format, with each keyword and value separated by an equal sign (=). Each *keyword=value* combination is delimited by at least one control or whitespace character. Comments may appear in the header section and are always delimited by braces. The MIFF header always ends with a colon (:) character, followed by a **newline** character. It is also common for a **formfeed** and a **newline** character to appear before the colon. You can then list the image keywords with *more(1)*, without printing the binary image that follows the colon separator.

The following is a list of *keyword=value* combinations that may be found in a MIFF file:

class=*DirectClass*

class=PseudoClass the type of binary image data stored in the MIFF file. If this keyword is not present, **DirectClass** image data is assumed.

colors=*value*

the number of colors in a **DirectClass** image. For a **PseudoClass** image, this keyword specifies the size of the colormap. If this keyword is not present in the header, and the image is **PseudoClass**, a linear 256 color grayscale colormap is used with the image data.

columns=*value*

the width of the image in pixels. This is a required keyword and has no default.

compression=RunlengthEncoded

compression=Zip the type of algorithm used to compress the image data. If this keyword is not present, the image data is assumed to be uncompressed.

delay *<1/100ths of a second>*

the interframe delay in an image sequence. The maximum delay is 65535.

depth=8

depth=16 the depth of a single color value representing values from 0 to 255 (depth 8) or 65535 (depth 16). If this keyword is absent, a depth of 8 is assumed.

gamma=*value*

the gamma of the image. If it is not specified, a gamma of 1.0 (linear brightness response) is assumed,

id=ImageMagick

identifies the file as a MIFF-format image file. This keyword is required and has no default. Although this keyword can appear anywhere in the header, it should start as the first keyword of the header in column 1. This will allow programs like **file**(1) to easily identify the file as MIFF.

label= *value""*

defines a short title or caption for the image. If any whitespace appears in the label, it must be enclosed within double quotes.

matte=True

matte=False specifies whether a **DirectClass** image has matte data. Matte data is generally useful

for image compositing. This keyword has no meaning for pseudo-color images.

montage=*<width>x<height>{+-}<x offset>{+-}<y offset>*
size and location of the individual tiles of a composite image. See **X(1)** for details about the geometry specification.

Use this keyword when the image is a composite of a number of different tiles. A tile consists of an image and optionally a border and a label. *<width>* is the size in pixels of each individual tile in the horizontal direction and *<height>* is the size in the vertical direction. Each tile must have an equal number of pixels in width and equal in height. However, the width can differ from the height. *<x offset>* is the offset in number of pixels from the vertical edge of the composite image where the first tile of a row begins and *<y offset>* is the offset from the horizontal edge where the first tile of a column begins.

If this keyword is specified, a directory of tile names must follow the image header. The format of the directory is explained below.

packets=*value*
the number of compressed color packets in the image data section. This keyword is optional for **RunlengthEncoded** images, mandatory for **Zip** images, and not used for uncompressed image.

rows=*value*
the height of the image in pixels. This is a required keyword and has no default.

scene=*value*
the sequence number for this MIFF image file. This optional keyword is used when a MIFF image file is one in a sequence of files used in an animation.

signature=*value*
this optional keyword contains a string that uniquely identifies the image pixel contents. RSA's Data Security MD5 Digest Algorithm is recommended.

The following is a sample MIFF header. In this example, <FF> is a formfeed character:

```
id=ImageMagick
class=PseudoClass  colors=256  signature=d79e1c308aa5bbcdeea8ed63df412da9
compression=RunlengthEncoded  packets=27601
columns=1280  rows=1024
scene=1
{
  Rendered via Dore by Sandi Tennyson.
}
<FF>
:
```

Note that *keyword=value* combinations may be separated by newlines or spaces and may occur in any order within the header. Comments (within braces) may appear anywhere before the colon.

If you specify the **montage** keyword in the header, follow the header with a directory of image tiles. This directory consists of a name for each tile of the composite image separated by a **newline** character. The list is terminated with a NULL character.

Following the header (or image directory if the **montage** keyword is in the header) is the binary image data itself. How the image data is formatted depends upon the class of the image as specified (or not specified) by the value of the **class** keyword in the header.

DirectClass images (class=DirectClass) are continuous-tone, RGB images stored as intensity values in red-green-blue order. Each color value is one byte in size for an image depth of 8 and there are three bytes per pixel (four with an optional matte value). If the depth is 16, each color value is two bytes with the most significant byte being first. The total number of pixels in a **DirectClass** image is calculates by multiplying the rows value by the column value in the header.

PseudoClass images (class=PseudoClass) are colormapped RGB images. The colormap is stored as a series of red-green-blue pixel values, each value being a byte in size. If the image depth is 16, each colormap entry is two bytes with the most significant byte being first. The number of colormap entries is indicated by the colors keyword in the header, with a maximum of 65,535 total entries allowed. The colormap data occurs immediately following the header (or image directory if the **montage** keyword is in the header).

PseudoClass image data is an array of index values into the color map. If there are 256 or fewer colors in the image, each byte of image data contains an index value. If the image contains more than 256 colors or the depth is 16, the index value is stored as two contiguous bytes with the most significant byte being first. The total number of pixels in a **PseudoClass** image is calculated by multiplying the rows value by the columns value in the header.

The image data in a MIFF file may be uncompressed or may be compressed using one of two algorithms. The compression keyword in the header indicates how the image data is compressed. The run-length encoding (RLE) algorithm may be used to encode image data into packets of compressed data. For **DirectClass** images, runs of identical pixels values (not BYTE values) are encoded into a series of four-byte packets (five bytes if a matte value is included). The first three bytes of the packet contain the red, green, and blue values of the pixel in the run. The fourth byte contains the number of pixels in the run. This value is in the range of 0 to 255 and is one less than the actual number of pixels in the run. For example, a value of 127 indicates that there are 128 pixels in the run.

For **PseudoClass** images, the same RLE algorithm is used. Runs of identical index values are encoded into packets. Each packet contains the colormap index value followed by the number of index values in the run. The number of bytes in a **PseudoClass** RLE packet will be either two or three, depending upon the size of the index values. The number of RLE packets stored in the file is specified by the packets keyword in the header, but is not required.

Use Zip compression to achieve a greater compression ratio than run-length encoding. The number of compressed packets stored in the file is specified by the packets keyword in the header.

MIFF files may contain more than one image. Simply concatenate each individual image (composed of a header and image data) into one file.

SEE ALSO

display(1), animate(1), import(1), montage(1), mogrify(1), convert(1), more(1), compress(1)

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