ART 223

INTRODUCTION TO DIGITAL PHOTOGRAPHY
ANNOTATED LIST OF PHOTOGRAPHIC FILE FORMATS:

Digital Photographic file formats exist as a subset of the larger set of formats that are available to visual image makers in general. The file formats that are listed below are specifically formats for the recording of imagery through various camera devices. This list is not exhaustive but contains references to most of the major photographic file formats.

JPEG/JFIF

JPEG (Joint Photographic Experts Group) is a compression method; JPEG-compressed images are usually stored in the **JFIF** (JPEG File Interchange Format) file format. JPEG compression is (in most cases) lossy compression. The JPEG/JFIF filename extension is **JPG** or **JPEG**. Nearly every digital camera can save images in the JPEG/JFIF format, which supports 8-bit grayscale images and 24-bit color images (8 bits each for red, green, and blue). JPEG applies lossy compression to images, which can result in a significant reduction of the file size. The amount of compression can be specified, and the amount of compression affects the visual quality of the result. When not too great, the compression does not noticeably detract from the image's quality, but JPEG files suffer generational degradation when repeatedly edited and saved. The JPEG 2000 format was introduced to address many of the issues listed above but is not widely supported yet.

Pros: *Widely supported and available on most equipment.*

File compression allows for smaller files requiring less data storage space

Good for small, low quality image presentation (web, social media, etc.)

Cons: *Lossy compression (data that is lost in compression is permanently discarded)**.***

Images degrade each time they are saved (generational degradation).imagery

Generally lower quality files

HEIF

The HEIF (Hight Efficiency Image Format) was introduced in 2015 and has been adopted for some camera systems (especially Apple iPhones). This format provides enhanced image quality vs. the JPEG format and does so with even smaller file sizes. These smaller file sizes allow for quick transmission of images. In addition this format allows for

This format is not widely supported in web and social media environments.

Pros: *High level of image quality.*

Very low data storage requirements

Allows for used with some time-based features (i.e. Live Photo, et al)

Supports up to 16 bit color (JPEG has a maximum 8 but color)

Cons: *Not widely supported on a broad range of photo equipment.*

Patented and proprietary vs JPEG being open source.

Exif

The **Exif** (Exchangeable image file format) format is a file standard similar to the JFIF format with TIFF extensions; it is incorporated in the JPEG-writing software used in most cameras. Its purpose is to record and to standardize the exchange of images with image metadata between digital cameras and editing and viewing software. The metadata are recorded for individual images and include such things as camera settings, time and date, shutter speed, exposure, image size, compression, name of camera, color information. When images are viewed or edited by image editing software, all of this image information can be displayed.

The actual Exif metadata as such may be carried within different host formats, e.g. TIFF, JFIF (JPEG) or PNG. IFF-META is another example.

DNG

DNG (Digital Negative) is a **patented**, open, lossless, raw image format developed by Adobe and used for digital photography. It was launched on September 27, 2004. All Adobe photo manipulation software (such as Adobe Photoshop and Adobe Lightroom) released since the launch supports DNG.[4]

DNG is based on the TIFF/EP standard format, and mandates significant use of metadata. Use of the file format is royalty-free; Adobe has published a license allowing anyone to exploit DNG,[5] and has also stated that there are no known intellectual property encumbrances or license requirements for DNG.

Pros: *Robust image compression provides smaller files with high quality.*

Fully supported by popular Adobe image software (PSD, etc.)

Cons: *Not widely supported on a broad range of photo equipment.*

Patented and proprietary vs JPEG being open source.

TIFF

The **TIFF** (Tagged Image File Format) format is a flexible format that normally saves 8 bits or 16 bits per color (red, green, blue) for 24-bit and 48-bit totals, respectively, usually using either the **TIFF** or **TIF** filename extension. TIFF's flexibility can be both an advantage and disadvantage, since a reader that reads every type of TIFF file does not exist. TIFFs can be lossy and lossless; some offer relatively good lossless compression for bi-level (black&white) images. Some digital cameras can save in TIFF format, using the LZW compression algorithm for lossless storage. TIFF image format is not widely supported by web browsers. TIFF remains widely accepted as a photograph file standard in the printing business. TIFF can handle device-specific color spaces, such as the CMYK defined by a particular set of printing press inks. OCR (Optical Character Recognition) software packages commonly generate some (often monochromatic) form of TIFF image for scanned text pages.

Pros: *varied image compression options.*

Fully supported by popular Adobe image software (PSD, etc.)

An open source format

Cons: *Files tend to be very large requiring large amounts of storage space.*

Patented and proprietary vs JPEG being open source.

RAW

RAW refers to raw image formats that are available on some digital cameras, rather than to a specific format. These formats usually use a lossless or nearly lossless compression, and produce file sizes smaller than the TIFF formats. Although there is a standard raw image format, (ISO 12234-2, TIFF/EP), the raw formats used by most cameras are not standardized or documented, and differ among camera manufacturers.

Most camera manufacturers have their own software for decoding or developing their raw file format, but there are also many third party raw file converter applications available that accept raw files from most digital cameras. Some graphic programs and image editors may not accept some or all raw file formats, and some older ones have been effectively orphaned already.

NON RECORRDING DIGITAL FILE FOMATS

There are many file formats that are routinely associated with digital photography. Unlike the file formats listed above however, these formats are not employed in conjunction with actual digital photographic equipment but instead are employed for processing these images after the recording process. Indeed, several of the file formats listed above may also be employed in the editing workflow of a digital photographer . Below is a partial list of file formats that are commonly employed in post-production by digital photographers:

GIF

GIF (Graphics Interchange Format) is limited to an 8-bit palette, or 256 colors. This makes the GIF format suitable for storing graphics with relatively few colors such as simple diagrams, shapes, logos and cartoon style images. The GIF format supports animation and is still widely used to provide image animation effects. It also uses a lossless compression that is more effective when large areas have a single color, and ineffective for detailed images or dithered images.

BMP

The BMP file format (Windows bitmap) handles graphics files within the Microsoft Windows OS. Typically, BMP files are uncompressed, hence they are large; the advantage is their simplicity and wide acceptance in Windows programs.

PNG

The PNG (Portable Network Graphics) file format was created as the free, open-source successor to GIF. The PNG file format supports 8 bit paletted images (with optional transparency for all palette colors) and 24 bit truecolor (16 million colors) or 48 bit truecolor with and without alpha channel - while GIF supports only 256 colors and a single transparent color. PNG provides a patent-free replacement for GIF and can also replace many common uses of TIFF. Indexed-color, grayscale, and truecolor images are supported, plus an optional alpha channel.

PNG is designed to work well in online viewing applications like web browsers so it is fully streamable with a progressive display option.

PSD

Photoshop files have default file extension as **.PSD**, which stands for "Photoshop Document." A PSD file stores an image with support for most imaging options available in Photoshop. These include layers with masks, color spaces, ICC profiles, CMYK Mode (used for commercial

printing), transparency, text, alpha channels and spot colors, clipping paths, and duotone settings. A PSD file has a maximum height and width of 30,000 pixels, and a length limit of 3 Gigabytes.

WEBP

WebP is a new image format that uses lossy compression. It was designed by Google to reduce image file size to speed up web page loading: its principal purpose is to supersede JPEG as the primary format for photographs on the web.