EXIFutils

Image Metadata Utilities

Getting Started Guide

for
Linux / Mac OS X

V3.0

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Contents

EXIFutils Getting Started Guide

1 Introduction

1.1 Structure of this Manual

The sections in this manual cover three areas:

Section 1 provides an overview of this manual.

Section 2 describes concepts common to all EXIFutils commands.

Section 3 describes how the EXIFutils can be used to perform a number of tasks commonly required by digital image users.

1.2 Intended Audience

This manual is intended for new users of the EXIFutils who wish to understand basic image Meta data concepts, how to install the EXIFutils, and how to perform basic operations. It assumes that the reader has a working knowledge of the use of Linux/UNIX systems. In particular it is assumes that the reader understands:

- o The use of at least one UNIX command shell,
- o How to redirect the output of a command into a file,
- o How to pipe the output of one command into another command,
- o The use of quotes and wildcards on the command line.

1.3 Conventions Used in this Manual

The following conventions are used in this manual.

`myphoto.jpg`	Text in the `Courier New` font represent examples that must be typed exactly as shown.

field-list.txt

Text in *Italicized Courier New* font represent text for which you must substitute an appropriate value, for example in the following code fragment:

```
-u "your name"
```

you should replace "*your name*" with your own name.

`[ ]`

Square brackets surrounding text in a command description indicate that the text is optional. For example, if a command is shown as having the following option:

```
[-t]
```

then the `-t` option is optional and need not be entered.

`[a|b]`

Indicates that you must enter either `a` or `b`. For example, if a command is shown as having the option:

```
-t [a|r]
```

then you must enter either

```
-t a
```
or
```
-t r
```

`...`

The ellipse symbol "`...`" indicates that the item preceding it can be repeated multiple of times. The example below indicates that multiple file names can be entered separated by commas:

```
filename,...
```

`\`

A backslash character at the end of a line indicates that whatever follows on the next line is a continuation of the same command. Example:

```
exiflist -o l -f make,model \
my-file.jpg
```

is the same as:

```
exiflist -o l -f make,model my-file.jpg
```

1.4 Feedback

If you have any feedback on the content or structure of this manual, or if you have any suggestions on how the EXIFutils can be improved, please send email to: support@hugsan.com.

2 Overview

2.1 What are the EXIFutils?

The EXIFutils are a suite of command line utilities that can be used to extract, modify, copy, or delete Meta data that is embedded within image files. There are seven utilities in the suite:

Command	Purpose
exifcopy	1. Copy EXIF, IPTC, XMP and Flashpix Meta data unmodified from one image JPEG file to another. 2. Copy individual metadata fields from one image file to another.
exifdate	Modify the EXIF date fields in an image file.
exifedit	Add, remove, or change the value of metadata fields in an image file. Only files that are *editable* can be modified. See Section 2.3.3 for an explanation of editable and non-editable fields.
exiffile	1. Change the "last modified" timestamp of an image file to match the date that the image was taken. 2. Rename image files based on the value of metadata fields.
exifkey	Install and display EXIFutils license key
exiflist	Extract metadata field values from an image file in a variety of formats.
exifinfo	1. List the definitions and valid values of metadata fields. 2. List global EXIFutils settings and environment variable. 3. List known XMP schemas.

While all EXIFutils commands can be invoked manually from the Shell command prompt, they are primarily intended for invocation as part of a batch script or other automated background process. eg exporting EXIF data into a database for cataloguing.

2.2 What is Meta Data

The EXIFutils are a suite of utilities that extract and manipulate Meta data in image files. Image Meta data is information that describes an image. It can include information store in the image file by the camera or scanning device that created the image, and information added later to assist in the cataloguing or distribution of the image file.

There are several standards for the format and content of Meta data stored in image files. EXIFutils supports five Meta data formats:
- o EXIF
- o IPTC
- o XMP
- o Flashpix
- o Canon Raw (.CRW files)
- o Ricoh RMETA

These are described in more detail in the following subsections.

2.2.1.1 What is EXIF Data?

EXIF (EXchangeable Image file Format) is a standard created by Japanese Electronic Industry Development Association (JEIDA) for the storage of camera and image information within JPEG and TIFF image files. The standard is described in the document "JEITA CP-3451, Exchangeable image file format for digital still cameras: Exif Version 2.4".

Most digital cameras now use this standard format to store information in the image files they create. The information stored can include:
- o Information about the camera that took the image (eg: make, model)
- o The camera settings at the time the image was taken
- o The picture taking conditions at the time a image was taken.
- o The location and orientation of the camera
- o Descriptive comments or audio recording added by the photographer.

EXIF fields are described in more detail in EXIFutils Field Reference Guide.

With the introduction of the XMP Specification, EXIF fields can be stored in the original JEITA format, XMP format, or both. See Section 2.2.1.6 "What is XMP?"

2.2.1.2   What is IPTC Data?

The International Press Telecommunications Council (IPTC) defined a standard for information describing News images. The current version of this standard is described in the document "IPTC Photo Metadata: Core 1.1/Extension 1.1 (July 2009) - Doc Rev 1". The information that can be stored in IPTC fields includes:
- o Headline associated with image
- o By Line of the author
- o Location at which the image was taken
- o Caption associated with the image
- o Keywords and categories for filing the image
- o An indication of the urgency of the image
- o Image distribution information

Adobe Photoshop was the first application to include IPTC information in JPG and TIFF files (using the Photoshop "File Info" menu). The format developed by Adobe became the de facto standard for storing IPTC information within image files. In recent years the original Adobe format has been replace by the newer XMP specification (see Section 2.2.1.6)

IPTC fields are described in more detail in Section EXIFutils Field Reference Guide.

2.2.1.3   What is Flashpix Data?

The Flashpix format definition is a cooperative endeavor that included the Digital Imaging Group, Microsoft Corporation, the Hewlett-Packard Company, and Live Picture, Inc. The definition is described in the document "Flashpix Format Specification, Version 1.0.2".

The Flashpix format allows the storage of streams of data in the image file. EXIFutils supports two types of operations on Flashpix data:
1. Copying of all Flashpix data from one JPEG file to another (using the `exifcopy` utility).
2. Extracting a Flashpix audio stream into a separate file (using the `exiflist` utility).

2.2.1.4   What is Canon Raw (.CRW) Data?

Some early Canon cameras (eg: Canon 10D) store RAW images in Canon Raw (.CRW files) format, containing image meta data in a Canon proprietary format. Much of this data is similar to EXIF data, but is stored in a different format. As Canon does not publish the format of .CRW Meta data, the accuracy and completeness of the .CRW Meta data as interpreted by EXIFutils cannot be guaranteed.

Not all EXIFutils functions can be performed on Canon Raw Meta data. The exiflist supports the extraction and display of CRW Meta data, and `exifcopy` supports copying of certain Canon Meta data fields into files of other formats. See the EXIFutils Command Reference Manual for details.

NOTE: More recent Canon cameras use the Canon .CR2 Raw file format. This file format contains EXIF data, and is therefore not subject to the same restrictions as Canon .CRW files.

2.2.1.5   What is Ricoh RMETA Data?

Some Ricoh cameras (eg, the Ricoh Pro G3 GPS-capable camera) allow the user to define the name and value of up to five "custom" fields. These fields contain text values. They are stored in the image file in an RMETA data block, which is completely separate from the EXIF and IPTC data blocks. EXIFutils provides read only access to these fields.

2.2.1.6   What is XMP?

In September 2001 Adobe introduced its new metadata framework - the "Extensible Metadata Platform (XMP)". The XMP specification does not describe new information to be stored in digital images; rather it describes a new, more consistent and flexible way of storing meta data fields in digital images. Eventually the XMP format may replace the various existing metadata formats currently used to store the types of metadata described above.

It is possible for metadata such as EXIF and IPTC fields to be stored twice in the same image – once in its original format and once in XMP format. EXIFutils treats these copies as completely separate fields and does not manage the consistency of data stored in both XMP and older formats. Each field is referenced separately using a different name.

For example, if the EXIF "model" field is stored in the traditional EXIF format then it can be referenced using the nickname `model`. If the same field is stored in XMP format then it can be referenced using the nickname `xtif-model`.

2.3 EXIFutils Concepts

2.3.1 Image Files

The EXIFutils commands support many common image file formats. Throughout this manual the term *image file* is used to refer to collectively to all of the supported file formats.[1]

Unless otherwise stated, the EXIFutils features described in this manual can be used on all supported image file types. Where there are restrictions on the image file types on which a feature can be used, the restrictions are explicitly stated.

Table 1 lists the supported image file types, and the EXIFutils commands that support them. A ✓ in the table indicates that all command features are supported with the corresponding image file type.

Table 1 Supported Image File Types

File Type \ Command	exifcopy	exifdate	exifedit	exiffile	exiflist
JPEG	✓	✓	✓	✓	✓
EXIF .EXI	✓	✓	✓	✓	✓
Adobe .DNG (Digital Negative)		✓	✓	✓	✓
TIFF		✓	✓	✓	✓
Nikon Raw .NEF	Note 1	✓	✓	✓	✓
Kodak Raw .DCR		✓	✓	✓	✓
Canon Raw .CR2		✓	✓	✓	✓
Minolta Raw .MRW		✓		✓	✓
Fujifilm Raw .RAF		✓		✓	✓
Olympus Raw .ORF	Note 2	✓	Not	✓	✓
Sony Raw .ARW		✓	Supported	✓	✓
Encapsulated Postscript .EPS		Not		✓	✓
Canon Raw .CRW	Note 3	Supported		Note 4	✓

Note 1: Only *editable* fields can be copied to or from these file types. Refer to the EXIFutils Field Reference Guide for more information on which fields are editable. See Section 2.3.3 "Editable and non-Editable Fields" for an explanation of editable fields.
Note 2: Fields can only be copied *from* these files type. These file types cannot be the destination of the copy operation.
Note 3: Fields can only be copied *from* Canon .CRW fillies. When copying, Canon Raw Meta data fields are translated into the closest equivalent EXIF field. See EXIFutils Command Reference Manual for details.
Note 4: Only the /n (rename file) option is supported.

2.3.1.1   EXIF Save (.exi) Files

An EXIF Save file is a file that contains only Meta data extracted from another image file. .EXI files are used to store Meta data for later copying into another image file.

The .EXI files create by EXIFutils are compatible with the .EXI files created by the *Exifer* application developed by Friedemann Schmidt[2].

---

[1] When processing image files in a directory, the EXIFutils do not rely on the file extension (eg .jpg) to determine the image file type. The EXIFutils commands read the beginning of each file to determine if it is a supported image file format.
[2] Exifer is available from http://www.friedemann-schmidt.com/software/exifer

2.3.2 Using Nicknames to Select Fields

Several of the EXIFutils commands allow you to specify a list of fields to display, edit, copy, or delete. To provide an easy way of referring to EXIF fields, the EXIFutils assign a *nickname* to each field. For example, the EXIF "description" field can be referenced using the nickname `description`. A complete list of field nicknames is provided in the EXIFutils Field Reference Guide.

In addition to the fields defined by the supported metadata specifications, the EXIFutils provide nicknames that represent other information of use to the user. There include:
- File attribute information (see Table 2 File Attribute Nicknames)
- Individual parts of the EXIF Date Taken field (see Table 3 EXIF Date Taken Subfield Nicknames)
- The names of files created by the EXIFutils (see Table 4 Created File Nicknames)

Table 2 File Attribute Nicknames

Nickname	Description
`file-name`	The name of the image file *excluding* the directory path, eg `myphoto.jpg`
`file-name-full`	The name of the image file *including* the directory path, eg `/HolidayPhotos/myphoto.jpg`
`file-base`	The part of the image file name that precedes the last dot '.'. For example, if the `file-name` is '`myphoto.jpg`', then `file-base` will contain '`myphoto`'.
`file-ext`	The file name extension, i.e. the part of the file name that follows the last dot '.'. For example, if the `file-name` is '`myphoto.jpg`', then `file-ext` will contain '`jpg`'.
`file-dir`	The directory in which the image file is located, eg `/HolidayPhotos`
`file-size`	The size of the file in bytes
`file-date-mod`	The date/time that the file was last modified. The date is in EXIF standard format, i.e. "YYYY:MM:DD HH:MM:SS"
`file-date-created`[3]	The date the file was created. The date is in EXIF standard format, i.e. "YYYY:MM:DD HH:MM:SS"

Table 3 EXIF Date Taken Subfield Nicknames

Nickname	Description
`yyyy`	Year part of `date-taken` field. Four digits. eg: "2005"
`yy`	Year part of `date-taken` field. Two digits. eg: "05"
`mm`	Month part of `date-taken` field. Two digits. eg: "12"
`mmm`	Month part of `date-taken` field. Three letters. eg: "dec"
`dd`	Day part of `date-taken` field. Two digits. eg: "31"
`hr`	Hour part of `date-taken` field. Two digits, using 24 hour clock. eg: "23"
`min`	Minute part of `date-taken` field. Two digits. eg: "59"
`sec`	Seconds part of `date-taken` field. Two digits. eg: "45"

NOTE: If the `date-taken` field is not present in a file, then the above nicknames will contain an empty string.

---

[3] `file-date-created` is only available on Windows systems. On MacOS X, Linux, and Solaris systems this field will contain the date of last state change of the file.

Table 4 Created File Nicknames

Nickname	Description
file-name-audio	The default name of the audio file that will be created by the exiflist -w command
file-name-backup	The name of the backup file that will be created by the exifcopy and exifedit commands.
file-name-exi	The default name of the EXIF Save file that will be created by the exiflist -e command
file-name-thumb	The default name of the thumbnail file that will be created by the exiflist -t command

2.3.2.1   Selecting Multiple Fields

In addition to specifying individual field names, the exiflist command provides two ways to select multiple meta data fields:

- o **Wildcards:** a wildcard character can be used to select all fields whose nickname start with a certain string. For example 'gps-*' will select all GPS related fields because the nicknames of all GPS related fields start with 'gps-'. The wildcard character '*' can only appear at the end of the string.
- o **Special Nicknames:** These are nicknames that can be used to select groups of fields:
  - o   all: Selects all supported metadata fields present in the image file. Refer to EXIFutils Field Reference Guide for a list of supported fields.
  - o   exif: Selects all EXIF fields present in the image file. Refer to EXIFutils Field Reference Guide for a complete list of EXIF fields[4].
  - o   exif-common: Selects the most commonly used EXIF fields. Refer to the EXIFutils Command Reference Manual for a list of fields that are included by exif-common.
  - o   iptc: Selects all IPTC fields. Refer to EXIFutils Field Reference Guide for a complete list of IPTC fields[5].
  - o   rmeta: Selects all Ricoh RMETA fields. Refer to EXIFutils Field Reference Guide for a complete list of RMETA fields.
  - o   xmp: Selects all meta data fields stored in XMP format. Refer to EXIFutils Field Reference Guide for a complete list of XMP fields.

2.3.3 Editable and non-Editable Fields

Editable fields are fields that EXIFutils allows to be set to a new value. Not all metadata fields are editable by users. There are a number of reasons for this:

1. The value of the field must be generated by EXIFutils to ensure correct formatting of the EXIF and IPTC data structure.
2. EXIFutils does not yet support formatting of the data type used by the field.
3. The field is a non-standard field that EXIFutils does not know how to correctly format. This is most often the case with Maker Note fields, which are defined by each camera manufacturers and for which the correct format definitions are not published.

A complete list of all fields, with an indication of whether they are editable by EXIFutils is available in the EXIFutils Field Reference Guide.

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[4] The exif nickname does **not** select EXIF fields stored in XMP format. To select EXIFfields store in XMP format use the xmp special nickname.

[5] The iptc nickname does **not** select IPTC fields stored in XMP format. To select EXIFfields store in XMP format use the xmp special nickname.

2.4 Installation

2.4.1 Microsoft Windows

To install the EXIFutils on a Windows system:

1. Download the EXIFutils installation program into a directory on your hard disk.

2. If your system requires you to log on, log on as a user who has sufficient privilege to install software.

3. Double-click on the installation program to start the installation process.

4. Follow the instructions displayed by the installation process

5. If asked to do so, reboot your system (this is necessary to add the EXIFutils to your PATH so that Windows knows where to find them)

6. If you have purchased a Full Use license for the EXIFutils, run `exifkey` to install the license:
    a. Open an MS-DOS Command Prompt window.
    b. Run `exifkey` to install the license, eg:

```
exifkey /k 1234567890123 /u "John Smith" /e john@smith.com
```

The license key, user name, and email address must be entered ***exactly*** as shown in the registration information you received when you purchased the license.

2.4.2 Linux Systems

To install the EXIFutils on a Linux or UN*X system do the follow:

1. Download the EXIFutils kit

2. Logon as the user who will be using EXIFutils.

3. Un-tar the kit into a directory that is in your execution PATH, eg:

```
cd ~/bin
tar xzvf EXIFutils-lin-300.tgz
```

4. If you have purchased a Full Use license for the EXIFutils, run `exifkey` to install the license:

```
exifkey –k 1234567890123 –u "John Smith" –e john@smith.com
```

The license key, user name, and email address must be entered ***exactly*** as shown in the registration information you received.

The license key is installed in the home directory of the user who ran `exifkey`. The user's home directory is located using the $HOME environment variable. In some system configurations the $HOME environment variable may not be set, and therefore `exifkey` will not be able to install the license key. See Section 2.4.4 "Location of License Key File on Linux, and MacOS X Systems" for information on how to install the license key in these environments.

2.4.3 MacOS X Systems

To install the EXIFutils on a MacOS X system do the follow:

1. Download the EXIFutils kit.

2. Logon as the user who will be using EXIFutils. The EXIFutils license will be installed into the home directory of this user.

3. Open Stuffit and drag the EXIFutils kit onto the "Expand Archives and Encoded Files" in the Drag and Drop Area. Save the EXIFutils files in directory on your disk.

4. In order to run the EXIFutils command from a Terminal window you will need to add the installation directory in into your execution PATH. To do this open a Terminal Window and enter the following commands:

```
cd exifutilsInstallDir
./exifinstall
```

where *exifutilsInstallDir* is the name of the directory into which you installed EXIFutils. For example, if you installed EXIFutils into your Documents directory, you would enter:

```
cd ~/Documents/EXIFutilsOSX3.0
exifinstall
```

Once you have executed the above commands exit the Terminal Windows and start a new one in order for the installation to take effect.

5. If you have purchased a Full Use license for the EXIFutils, open a TERMINAL window and run `exifkey` to install the license: :

    ```
    exifkey -k 1234567890123 -u "John Smith" -e john@smith.com
    ```

    The license key, user name, and email address must be entered *exactly* as shown in the registration information you received.

    The license key is installed in the home directory of the user who ran `exifkey`. The user's home directory is located using the $HOME environment variable. In some system configurations the $HOME environment variable may not be set, and therefore `exifkey` will not be able to install the license key. See Section 2.4.4 "Location of License Key File on Linux, and MacOS X Systems" for information on how to install the license key in these environments.

2.4.4 Location of License Key File on Linux, and MacOS X Systems

By default `exifkey` installs the EXIFutils license in the invoking user's home directory. It locates the user's home directory using the `$HOME` environment variable.

In some configurations, for example where the EXIFutils are being invoked by 3rd party software the `$HOME` environment variable may not be defined. To cater for these configurations an alternative method of specifying the license file directory is provided. The `EXIFLICDIR` environment variable can be used to specify the directory into which the license will be installed. If `exifkey` determines that the `HOME` environment variable is not defined, it will look at the contents of the `EXIFLICDIR` environment variable to locate the required directory. The `EXIFLICDIR` environment variable must be defined in the environment in which the EXIFutils commands will be run.

If neither the `HOME` nor `EXIFLICDIR` environment variables are defined, `exifkey` will attempt to install the license file in the root directory (/).

3 Common Tasks

This section describes how to use the EXIFutils to perform a number of common tasks. These are grouped into five categories:

Section 3.1 "Finding out what metadata fields exist, and what you can do with them" gives examples that show how to find out what EXIF and IPTC fields you can work with, and what operations you can perform on them.

Section 3.2 "Listing and Extracting Field Values" gives examples of how to extract field values for print or use by other programs, and how to extract thumbnails and audio data from an image.

Section 3.3 "Adding/Removing/Changing Individual Metadata fields" gives examples of adding, changing, and deleting individual meta data fields.

Section 3.4 "Copying or Removing all Metadata in an JPEG file" gives examples of how to copy meta data unchanged from one file to another, and removing all meta data from a file.

Section 3.5 "Changing File Dates and Names" gives examples renaming image files based on Meta data field values, and setting file dates based on EXIF data values.

3.1 Finding out what metadata fields exist, and what you can do with them

3.1.1 How do I find the nicknames of fields that are present in an image file?

To the list all of the meta data fields in a file, and the nicknames assigned to them, enter the following command:

```
exiflist -o dn filename.jpg
```

where filename.jpg is the name of the image file.

This command produces a list of all of the supported fields in the image file, their EXIFutils nickname, and their value.

Refer to the EXIFutils Command Reference Manual for more information on the use of the `exiflist` command to list field information.

3.1.2 How do I find the nickname of a particular metadata field?

A complete list of supported metadata fields (eg: EXIF, IPTC, XMP) and the nicknames assigned to them is included in the EXIFutils Field Reference Guide.

If you do not want to refer to the manual you can use the command:

```
exifinfo -f all -b
```

This command produces a complete list of all fields known to the EXIFutils, and the nicknames that have been assigned to them. The `-b` options tells `exifinfo` to only display a brief one line summary of the information known about each field.

Refer to the EXIFutils Command Reference Manual for more information on the use of the `exifinfo` command to list field information.

3.1.3 Which metadata fields can I edit?

A complete list of metadata fields, with an indication of which can be edited is included in the EXIFutils Field Reference Guide.

If you do not wish to refer to the reference guide, the same information can be obtained by entering the following command:

```
exifinfo -f all | more
```

This will list all known metadata fields. For each field it will show either a description of the values to which the field can be set, or will show "Not Editable" if the value of the field cannot be changed.

Refer to the EXIFutils Command Reference Manual for more information on the use of the `exifinfo` command.

3.1.4 What are the valid values to which I can set a specific metadata field?

A complete list of EXIF fields, along with details of the valid values to which each can be set, can be found in the EXIFutils Field Reference Guide. If you do not want to refer to the Field Reference Guide, you can display the same information using the `exifinfo` command, as described below.

If you do not know the nickname of the field you want to edit, see Section 3.1.2 "How do I find the nickname of a particular metadata field?" for instructions on how to find it.

Once you know the nickname of the field you want to edit, enter the command:

```
exifinfo -f nickname
```

Where *nickname* is the nickname of the field you want to edit. The output of this command tells you the valid values to which that field can be set. If the value is shown as "Not Editable" then you cannot set the value of that field.

If you want to list more than one field, you can include a list of fields to be displayed. For example:

```
exifinfo -f make,model,ip-caption,xmp-rating,gps\* | more
```

This command lists details of the `make`, `model`, `xmp-rating`, and `ip-caption` fields, and all GPS related fields.

See also Section 3.1.3 "Which metadata fields can I edit?".

3.1.5 How do I find out which EXIFutils commands will work with the type of image file I am using.

Some EXIFutils commands and options can only be used on certain types of image files. Section 2.3.1 "Image Files" explains which EXIFutils operations are supported for each file type. See also the EXIFutils Command Reference Manual for details of the file types supported by specific command options.

3.2 Listing and Extracting Field Values

3.2.1 How do I list all of the metadata fields in an image file?

The `exiflist` command is used to display meta data field values. When no other formatting option is specified, `exiflist` will display all fields that are present in the image file(s). For example, the following command will display all supported metadata fields present in the files `photo1.jpg` and `photo2.jpg`:

```
exiflist photo1.jpg photo2.jpg
```

If you only want to display EXIF fields, use the `-o exif` option:

```
exiflist -f exif photo1.jpg photo2.jpg
```

If you only want to display IPTC fields, use the `-o iptc` option:

```
exiflist -f iptc photo1.jpg photo2.jpg
```

If you only want to display RMETA fields, use the `-f rmeta` option:

```
exiflist -f rmeta photo1.jpg photo2.jpg
```

If you only want to display fields stored in XMP format, use the `-f xmp` option:

```
exiflist -f xmp photo1.jpg photo2.jpg
```

3.2.2 How do I export metadata to other programs

The `exiflist` command can be used to extract metadata in a number of formats suitable for importing to other programs. One of the most basic formats used is the comma-separated values list (CSV). In this format the field values are separated by commas. Most spreadsheet programs can import data from a file containing comma-separated value data. For example, if you wanted to create a spreadsheet containing the `file-name`, `date-taken`, `description` and `f-number` fields then you would use the command:

```
exiflist -o lh -f file-name,date-taken,ip-caption,f-number my-dir > my-dir.csv
```

This command extracts the specified fields from all image files in the directory `my-dir`, and writes them as a comma-separated list of values into the file `my-dir.csv`. An example of the contents of `my-dir.csv` produced by the above command is shown below:

```
file-name,date-taken,ip-caption,f-number
my-photo1.jpg,2002:03:16 10:58:00,This is a photo of Loch Ness in Winter,5.6
my-photo2.jpg,2002:03:16 11:07:00,,2.8
my-photo3.jpg,2002:03:16 11:20:00,"Got Nessy that time, for sure",4.0
```

Note that the first line contains the names of the fields that were included. This is because the `-o lh` option was used. If you do not want this first line to appear use the `-o l` option instead. Also note that `my-photo2.jpg` in the example contained no `ip-caption` field, so there is nothing between the second and third commas in the list for that file. Also note that the `ip-caption` field for `file my-photo3.jpg` has been enclosed in quotes because it contains the separator character ",".

Refer to the documentation for your spreadsheet program for an explanation of how to import data from a comma separated value file.

Refer to the EXIFutils Command Reference Manual for information about other formats in which data can be extracted by `exiflist`.

3.2.3 How do I list a single metadata field value for use in a script

The `exiflist` command can be used to extract a single field value, and can be invoked from within scripting languages.

To extract a single field use `exiflist` as follows:

```
exiflist -o l -f nickname filename
```

where *nickname* is the nickname of the field whose value you want to extract, and *filename* is the name of the file from which you want to extract it. For example:

```
>exiflist -o l -f shutter myphoto.jpg
1/125
>
```

Refer to Section 3.1.2 "How do I find the nickname of a particular metadata field?" for more information aboyr determining field nicknames.

Refer to the EXIFutils Command Reference Manual for information about extracting fields using `exiflist`.

3.2.4 How do I extract the Thumbnail image from an Image file?

Many image files contain a thumbnail image, which is a small version of the main image in the file. The `exiflist` command can be used extract the thumbnail image from an image file and store it in a separate file.

The basic command to extract the thumbnail image is:

```
exiflist -t . filename
```

where `filename` is the name of the file from which the thumbnail is to be extracted. The thumbnail will be written to a file whose name is generated from the filename from which it was extracted. For example, if the thumbnail were extracted from a file called `myphoto.jpg`, then thumbnail file would be called `myphoto-th.jpg`.

Refer to the EXIFutils Command Referrence Manual for information about extracting thumbnails using `exiflist`.

3.2.5 How do I extract the Flashpix audio stream from an image file?

Some image files contain a Flashpix audio recording. The `exiflist` command can be used extract the audio data from an image file and store it in a separate file.

The basic command to extract the thumbnail image is:

```
exiflist -w . filename
```

where `filename` is the name of the file from which the audio stream is to be extracted. The audio stream will be written to a file whose name is generated from the filename from which it was extracted. For example, if the audio stream were extracted from a file called `myphoto.jpg`, then audio file would be called `myphoto.wav`.

Refer to the EXIFutils Command Referrence Manual for information about extracting audio data using `exiflist`.

3.3 Adding/Removing/Changing Individual Metadata fields

3.3.1 How do I add metadata fields to an image file that doesn't already contain any fields?

The `exifedit` command is used to add metadata fields to an image file that does not already contain EXIF data. To use `exifedit` you need to know the nickname of the field you want to add, and the value to which you want to set it. See Section 3.1.2 "How do I find the nickname of a particular metadata field?" for an explanation of how to find the nickname of the field. See Section 3.1.4 "What are the valid values to which I can set a specific metadata field?" for an explanation of how to find out the value to which you can set that field.

Once you know the nickname and the value you want to set enter the following command:

```
exifedit -a nickname=value file-name
```

For example, if you want to add the shutter speed field (nickname `shutter`) with a value of 1/125 to `myphoto.jpg` enter the following command:

```
exifedit -a shutter=1/125 myphoto.jpg
```

Refer to the EXIFutils Command Referrence Manual for more information on the use of the `exifedit` command.

3.3.2 How do I change the value of a metadata field?

The method for changing a metadata field in an image is the same as for adding a new field value. See Section 3.3.1 "How do I add metadata fields to an image file that doesn't already contain any fields?" for more details.

3.3.3 How do I set the value of metadata field to the value of another metadata field?

The method of setting the value of one field to the value contained in another field is similar to the way you set any field value. The only difference is that you include the nickname of the field whose value you are using as the value you want to set. For example:

```
exifedit -a model={xtif-model} myphoto.jpg
```

This command sets the value of the EXIF `model` field to the value contained in the XMP `xtif-model` field. Note that you need to enclose the field nickname in curly brackets {} when using it as a field value.

3.3.4 How do I add a metadata field to an image file?

The method for adding an EXIF or IPTC field to an image is the same as for changing an existing EXIF field value. See Section 3.3.2 "How do I change the value of a metadata field?" for more details.

3.3.5 I've changed the size of the image, but the EXIF data does not reflect these changes. How do I update these fields?

Many image processing programs do not update the EXIF fields when you edit an image. If you change the dimensions of the image then the EXIF width and height fields are not updated, and the thumbnail image is not changed to match the new image.

The `exifedit` command has two options for updating EXIF fields to match the main image:
1. the `-s` option sets the `width` and `height` EXIF fields to the width and height of the main image.
2. the `-t a` option updates the thumbnail image to match the main image.

Using these options the EXIF data can be updated to match the main image. For example:

```
exifedit -s -t a myphoto.jpg
```

Some image processing programs remove all EXIF information from the image. See Section 3.4.1 for an explanation of how to save and recover EXIF information deleted by photo editing programs.

Refer to the EXIFutils Command Reference Manual for more information on the use of the `exifedit` command.

3.3.6 How do I delete one or more metadata fields from an image file?

The `exifedit` command is used to delete metadata fields from an image. To use `exifedit`, you need to know the nickname of the field(s) you want to delete. If you do not know the nicknames, see Section 3.1.2 "How do I find the nickname of a particular metadata field?" for an explanation of how to find the nicknames of the fields you want to delete.

Once you know the nicknames of the fields you want to delete, enter the following command:

```
exifedit -r nickname,... file-name
```

where `nickname,...` are the nicknames of the fields you want to delete, and `file-name` is the name of the files from which you want to delete them.

For example, if you want to delete the `shutter`, `f-number`, `comment`, and `ip-caption` fields from `myphoto.jpg` enter the following command:

```
exifedit -r shutter,f-number,comment,ip-caption myphoto.jpg
```

Refer to the EXIFutils Command Reference Manual for more information on the use of the `exifedit` command.

3.3.7 The camera's time was set incorrectly, how can I adjust the times in the EXIF data?

If the date/time clock in your camera was set incorrectly (eg because you forgot to change it for daylight saving/summer time), then you can use the `exifdate` command to adjust the values of the date time fields in the EXIF data. `exifdate` can add or subtract a constant value to/from EXIF date time fields, or can set them to a specific value.

For example, if you forgot to set your camera clock forward one hour when traveling to a new time zone, you can use the following `exifdate` command to adjust to EXIF date/time so that they are correct:

```
exifdate -a 01:00:00 my-dir
```

This command adds one hour to the EXIF date time fields of every image file in `my-dir`.

Refer to the EXIFutils Command Referrence Manual for more information about the `exifdate` command.

3.4 Copying or Removing all Metadata in an JPEG file

3.4.1 How do I replace Metadata removed from a JPEG file by photo editing program?

Some photo editing programs removed the Metadata when you save an image after editing it. You can use `exiflist` and `exifcopy` to save and restore the EXIF information by following these steps:
1. Use the `exiflist` command to extract the meta data from the image file into a `.exi` file.

    ```
    exiflist -e . myphoto.jpg
    ```

    This command will extract the meta information from `myphoto.jpg` and copy it into a file called `myphoto.exi`

2. Edit the image file using your photo editing program and save it when you are finished

3. Use `exifcopy` to copy the EXIF, IPTC, and Flashpix data from the `.exi` file into the edited file. For example

    ```
    exifcopy -o myphoto.exi myphoto.jpg
    ```

4. Delete the `.exi` file if you don't want to keep it.

Refer to the EXIFutils Command Reference Manual for more information of the use of the `exiflist` and `exifcopy` commands.

3.4.2 How do I copy Metadata from one JPEG file to another?

To copy Meta data (EXIF, IPTC, XMP and Flashpix) *unchanged* from one JPEG file to another use the `exifcopy` command. For example:

```
exifcopy photo1.jpg photo2.jpg
```

This command copies all Meta data fields unchanged from `photo1.jpg` to `photo2.jpg`. If `photo2.jpg` already contains any metadata then a warning will be printed and the EXIF data will not be copied. If you want to overwrite the metadata in `photo2.jpg`, then you must specify the `-o` (force overwrite) option. The following command will overwrite any EXIF, IPTC, or Flashpix data in `photo2.jpg` with the corresponding data from `photo1.jpg`:

```
exifcopy -o photo1.jpg photo2.jpg
```

Refer to the EXIFutils Command Reference Manual for more information on the use of `exifcopy`.

3.4.3 How do I copy metadata from one TIFF file to another (or between TIFF and JPEG files)?

The `exifcopy` command is used to copy fields to/from TIFF files. The basic form of the command is:

```
exifcopy -f fieldlist src-file dest-file
```

where *fieldlist* is a comma separated list of the fields you want to copy, *src-file* is the file you are coping fields from, and *dest-file* is the file you are copying fields to. For example:

```
exifcopy -f comment,description,copyright myphoto1.jpg myphoto1.tif
```

This will copy the `comment`, `description`, and `copyright` fields from `myphoto1.jpg` to `myphoto1.tif`. If you omit the field list (`-f` option) then by default all `exif-common` fields will be copied. See Section 2.3.2 "Using Nicknames to Select Fields" for a description of `exif-common`.

Note: If you are running EXIFutils without a registration key then you are limited to copying a maximum of five fields. If the `-f` option is omitted then by default only the fields `width`, `height`, `exp-time`, `f-number`, and `date-taken` will be copied.

Refer to the EXIFutils Command Reference Manual for more information on the use of `exifcopy`.

3.4.4 How do I remove all Metadata from an image file?

The `exifedit` command is used to delete all of one or more types of Meta data from a JPEG file. The types of meta data to be deleted is selected using the `-e` option. The `-e` options takes the following values:

      `-e e`   - delete all EXIF metadata
      `-e i`   - delete all IPTC metadata
      `-e f`   - delete all Flashpix metadata
      `-e x`   - delete all XMP metadata
      `-e a`   - delete all EXIF, IPTC, XMP, and Flashpix metadata

For example, the following command will delete all EXIF Meta data from the file `myfile.jpg`, but will leave any IPTC and Flashpix Meta data untouched:

```
exifedit -e e myfile.jpg
```

The `exifedit -e` option can only be used on JPEG files. Refer to the EXIFutils Command Referrence Manual for more information on the use of the `exifedit` command.

3.5 Changing File Dates and Names

3.5.1 How do I change the "last modified" date of a file to match the time the image was taken?

The `exiffile` command is used to change the "Last Modified" date of an image file. Specify the `-t` option to change the "Last Modified" date to match the date/time that the photo was taken. For example:

```
exiffile -t pic-dir
```

This command changes the "Last Modified" date/time of all image files in the directory `pic-dir` to match the date/time that each image file was taken.

Refer to the EXIFutils Command Reference Manual for more information on the `exiffile` command.

3.5.2 How do I set the EXIF Date Taken field to the date/time the image file was last modified?

The `exifedit` command can be used to set any of the EXIF date fields to the date/time an image file was last modified. This is done by setting the EXIF `date-taken` field to the value of the `file-date-mod` field. For example:

```
exifedit -a "date-taken={file-date-mod}" myphoto.jpg
```

Refer to the EXIFutils Command Reference Manual for more information on the `exifedit` command.

3.5.3 How do I rename an image file using the values of metadata fields?

The `exiffile` command is used to rename an image file based on the value of meta data fields within the file. The name to which the file will be renamed is specified using the `-n` option to set the template that describes the required file name. Refer to the EXIFutils Command Reference Manual for more information about templates.

For example, if `mydir` contains only JPG files and you want to rename them to the date/time that each image was taken, you would use the following command:

```
exiffile -n "{date-taken}.jpg" mydir
```

If `mydir` contains a mixture of JPG and TIF files, the following command will rename all image files to the date/time the image was taken, and keep the same file extension as the original file:

```
exiffile -n "{date-taken}.{file-ext}" mydir
```

`file-ext` is a special nickname that contains the file extension of the original file. Other file related nicknames are listed in Table 2 in Section 2.3.2 "Using Nicknames to Select Fields".

You can also use additional EXIFutils fields such as `date-taken` subfields (see 2.3.2). For example, if you want to rename the file using the date the image was taken, but do not want to use the EXIF standard date format, you can construct the field name, For example, if you want to format the date using the American-style year-day-month format:

```
exiffile -n "{yyyy}{dd}{mm}-{hr}{min}{sec}.{file-ext}" mydir
```

Refer to the EXIFutils Command Referrence Manual for more information on the `exiffile` command.

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