EXIFutils

Image Metadata Utilities

Command Reference Guide

for
Microsoft Windows

V2.7

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Contents

1 Introduction

1.1 Structure of this manual

The sections in this manual cover the following topics:

Section 1 "Introduction" provides an overview of this manual and the changes that have been made since the previous version of EXIFutils.

Section 2 "Basic Command Syntax" explains the command option formats that are common to all EXIFutils commands.

Section 3 "Referencing Fields Using Nicknames" describes methods used to refer to Meta data (EXIF, IPTC, and RMETA) fields.

Section 4 "Working with Dates and Times" explains the EXIFutils features that assist in manipulating date and time fields.

Section 5 "Character Sets" explains how EXIFutils interprets multinational characters, and how EXIFutils can be configured to interpret and display different character sets.

Section 6 "Templates" explains the use of substitution *templates* in EXIFutils commands.

Section 7 "Command Reference" describes in detail the features and use of each EXIFutils command.

Section 8 "EXIFutils Field Nicknames" provides a reference list of the EXIF fields, IPTC fields, RMETA fields, and file attributes that the EXIFutils can access.

1.2 Intended Audience

This manual is intended for users of the EXIFutils who understand the basic concepts of the EXIFutils and want detailed information on the use of each command. It assumes that the reader has a working knowledge of the use of Windows systems. In particular it is assumed that the reader understands:
   o   The use of the MS-DOS command language and .BAT files,
   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 represents examples that must be typed exactly as shown.
`field-list.txt`	Text in *`Italicized Courier New`* font represents 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 entering:

```
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.

1.5 What's New in V2.7?

This section describes the new features introduced in V2.7, and changes to existing features.

1.5.1 Improved Support for International Characters Sets

- Added support for viewing and editing Windows XP UNICODE fields. The Windows XP fields are:

  ```
  xp-title-text
  xp-title
  xp-comment
  xp-author
  xp-keyword
  xp-subject
  ```

- Added `/u` option to `exifedit` to specify that EXIF Comment fields are to be stored in UNICODE (previous only ASCII comments were supported). See Section 5.3 "EXIF Comment Field" for more information.
- Improved support for international characters in EXIF and IPTC text fields. The `/p` option has been added to `exifcopy`, `exifile`, `exifedit`, and `exiflist` to specify the character sets to be used to interpret EXIF and IPTC text fields. Environment variables can also be used to specify characters sets. Added `/i` option to `exiflist`, to display the character sets being used. See Section 5 "Character Sets" for more information.

1.5.2 Read-only Support for Encapsulated Postscript (.eps) Files

Read-only access to Meta data in Encapsulated Postscript (`.eps`) files is now supported by `exiffile`, `exiflist` and `exifcopy`. Editing of `.eps` files with `exifedit` and `exifdate` is not supported.

1.5.3 Ricoh 'RMETA' Custom Fields now supported.

Ricoh Pro G3 GPS-capable camera allow the use to define the names and values of up to five custom fields. EXIFutils now supports reading of these fields (see Section 8.9 for a list of RMETA fields).

1.5.4 Ricoh Maker Notes now supported

Ricoh Specific Maker Note fields are now readable and editable.

1.5.5 Support for Windows XP Tag 0x4747

The Windows XP Digital Image Pro Tags field (tag 0x4747) is now supported.

1.5.6 Maximum Length of ip-keyword field increased

The maximum length that of text strings that can be entered in the `ip-keyword` field has been increased fom 32 to 1999 characters.

1.5.7   Improved support for IPTC Coded Character Set field (1:90)

A list of defined values had been added for the IPTC Coded Character Set field (1:90), nickname `ip1-char-set`.

1.5.8 Bug Fixes

- Fix bug where two fields had the same nickname (n3-color-mode). Second occurence of the field was renamed to n3-color-mode2.
- Make handling of invalid 'next IFD' offset pointers more robust. In previous versions invalid offset pointers cause a "too many format errors" message and resulted in incomplete EXIF data.
- Fix bug in handling of TIFF strip offsets and lengths with datatype SHORT.

- Fix bug in exiflist -t option that caused extracted thumbnail to be incorrect for some Nikon images. The problem occured when there were two thumbnails in the image, one of which was in the Nikon Maker note.
- Rename "Nikon NEF Thumbnail" IFD to "Nikon Thumbnail" as this IFD can also appear in JPEG files.
- Fix bug in editing files containing Thumbnails embedded in Nikon Maker Notes
- Fix bug that caused incorrect values to be set when IPTC values were being both set and used as template values in the same exifedit command.
- Improve validation of command arguments containing @ file input as invalid values could cause the program to crash.
- `exifedit` would not accept `exif-ver` field values higher than version "220". It will now accept any minor version of V2.2, i.e. "220", "221,… "229".

2 Basic Command Syntax

This section provides a brief overview of the command formats common to all EXIFutils commands. These guidelines are correct when using the Windows Command prompt, and when using UNIX command shells based on the Bourne shell. With other command shells and scripting languages the format of the commands may vary. Refer to the documentation provided with your command shell for more information.

The basic format of all commands is:

```
commandname option option option filename filename
```

`commandname` is the name of the EXIFutils command being executed, eg: `exiflist`.

`option` is an option that changes the behaviour of the command. There may be no options, one option, or multiple options. All options start with a '/' character.

`filename` is the name of a file on which the command will operate. Depending on the command there may no `filenames`, one `filename`, or multiple `filenames`. For some EXIFutils commands/options the `filename` can also be the name of a directory, in which case all files in that directory will be processed.

2.1 Types of Command Options

Command *options* can take one of two different formats:
- o **Simple options:** consist of a '/' followed by a single character that identifies the option being used. The presence of the option affects the behaviour of the command. For example, the '/q' option on `exiflist` sets 'quiet mode' to suppress warning messages.
- o **Complex options:** Like simple options, complex option start with a '/' followed by a single character that identifies the option. However complex options are followed by an *option string* that further controls the action of the option. For example, the '/f' options on `exiflist` specifies a list of fields to be displayed. The '/f' is therefore followed by a string containing the field lis, eg:

```
exiflist /f description,make,model myfile.jpg
```

If the option string contains any of the following characters – " `,;[]`" – then the whole option string must be surrounded by quotes:

```
exiflist /f "description, make, model" myfile.jpg
```

```
exifedit /a "comment=I took this photo" myfile.jpg
```

If the option string contains quote characters, then each quote must be preceded by the escape character "\" so that the command does not confuse this quote as marking the end of the option string:

```
exifedit /a "comment=\"I took this photo, too\", shutter=2" myfile.jpg
```

3 Referencing Fields Using Nicknames

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 EXIF, IPTC, and RMETA field. A complete list of field nicknames is provided in Section 8.

In addition to the fields defined by the EXIF and IPTC Specifications, EXIFutils provides additional nicknames that represent other information. There include:

- File attribute information (see Table 1 File Attribute Nicknames)
- Individual parts of the EXIF Date Taken field (see Table 2 EXIF Date Taken Subfield Nicknames)
- The names of files created by the EXIFutils (see Table 3 Created File Nicknames)

Table 1 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`[1]	The date the file was created. The date is in EXIF standard format, i.e. "YYYY:MM:DD HH:MM:SS"

Table 2 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 return no value.

---

[1] `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 3 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

3.1 Selecting Multiple Fields

In addition to specifying individual field names, the exiflist command provides two quick ways to select multiple EXIF and IPTC 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:** There are two special nicknames that can be used to select commonly used groups of fields:
  - o exif-common: 'exif-common' is predefined to select the most commonly used EXIF fields. Refer to Section 8 for a list of fields that are included by exif-common.
  - o iptc: 'iptc' is predefined to select all IPTC (Dataset 2) Editorial fields. Refer to Section 8.7 for a complete list of IPTC fields.

4 Working with Dates and Times

EXIF date/time fields are stored in a different format to IPTC date and time fields. All EXIF date/time fields include both the date and the time, in the following format:

"`YYYY:MM:DD HH:MM:SS`", eg: "`2004:01:27 21:53:00`"

All EXIF date/time fields contain both the date and the time. You cannot omit the time.

IPTC dates and times are stored in separate fields, eg the `ip-date` and `ip-time` fields.

IPTC date fields are stored in the following format: "`YYYYMMDD`", eg: "`20040127`"

IPTC time fields are stored in the following format: "`HHMMSS+/-ZZZZ`", eg: "`212300+10000`"

where `HHMMSS` is the time in the local timezone, and `+/- ZZZZ` indicates the timezone. For example, "`090000-0500`" represents 9:00am in New York (5 hours ahead of GMT/UTC).

You can use the `exifedit` command to set the value of date, time, and date/time fields. When you are setting the value of a date, time, or date/time field, `exifedit` does not require that the date and/or time be entered in the format in which it will be stored. `exifedit` accepts a number of date/time formats and converts them to the format required by the field you are setting.

The sections that follow describe the date/time formats that are accepted by `exifedit`.

4.1 Dates Formats

Table 4 shows the date formats that are accepted by `exifedit`.

Table 4 Accepted Date Formats

`YYYY-MMM-DD`
`DD-MMM-YYYY`
`DD-MM-YYYY`
`YYYY-MM-DD`
`DDMMYYYY`
`YYYYMMDD`
`YY-MM-DD`
`DD-MM-YY`
`YYMMDD`
`DDMMYY`

where:
- o   `YYYY` is the year, eg: `2004`
- o   `YY` is the year within the century, eg: "`04`"
- o   `MM` is the month number, eg: `05` for May
- o   `MMM` is the three-character month abbreviation. Valid values are "Jan", "Feb", "Mar", "Apr", "May", "Jun", "Jul", "Aug", "Sep", "Oct", "Nov", and "Dec". Values are not case sensitive; for example "FEB" and "feb" are valid months.
- o   `DD` is the day of the month, eg: `01`

Where a dash separator is shown in Table 4, any of the following separators will be accepted: "`:`", "`.`", or "`/`". For example "`01:04:2004`" and "`01/04/2004`" are valid dates.

4.2 Time Formats

Table 5 shows the time formats that are accepted by `exifedit`.

Table 5 Accepted Time Formats

HH-MM-SS
HHMMSS
HH-MM
HHMM
HH-MM-SS±ZZZZ
HHMMSS±ZZZZ
HH-MM±ZZZZ
HHMM±ZZZZ
HH-MM-SS ±ZZZZ
HHMMSS ±ZZZZ
HH-MM ±ZZZZ
HHMM ±ZZZZ

where:
- o   HH is the hour in 24 hour notation, eg: "13" means 1pm
- o   MM is the minutes within the hour, eg: "56"
- o   SS is the seconds within the minute, eg: "12"
- o   ±ZZZZ is the timezone, eg: "+0500", "-1000".

Where a dash separator is shown in Table 5, the following separators will be accepted: ":", ".", or "/". For example "`12:04:00`", "`12.04.00`" and "`12/04/00`" are valid times.

When no SS (seconds) value is specified, an SS value of "00" will be assumed. Where no timezone is specified a time value of "+0000" will be assumed.

4.3 Ambiguous or Incomplete Dates and Times

If an incomplete or ambiguous date or time value is specified, the following rules will be used to interpret the value:
- o   If a date/time field is being set and only a date value has been supplied, the time part of the field will be set to midnight (00:00:00). If you only supply a time for a date/time field, an error will be reported and the field not set.
- o   If no timezone is specified for a field that requires a timezone, then GMT is assumed (i.e. +0000)
- o   If the 'seconds' part of a time value is omitted then a 'seconds' value of '00' is assumed.
- o   If a two-digit year is specified (eg: "04", "99") `exifedit` will attempt to select the correct century. If the two-digit year is less than "20" the date is assumed to be in the 21st century, eg. "04" is assumed to mean "2004". If the two-digit year is "20" or geater it is assumed to be in the 20th century, eg: "99" is assumed to be "1999".

Note that in some cases it will not be possible for EXIFutils to unambiguously determine your intended value. For exampled, the value "23:59:59" is unambiguously a time value, but "04:10:01 can either be October 1st 2004, or a time in the early morning (04:10:01AM). In cases where the specified value is both a valid date and a valid time, EXIFutils will look at the type of field being set to determine what was intended. If the field being set is a date field or a date/time field, the value will be interpreted as a date. If the field being set is a time then the value will be interpreted as a time.

EXIFutils will also attempt to interpret dates in both the American 'month first' format (eg MM:DD:YY) and the international format (DD:MM:YY), however it is not always possible to determine which is intended. For example, 03:01:04 could mean either March 1st 2004 or January 3rd 2004. In these cases EXIFutils assumes the international format as it most closely matches the date formats used by EXIF and IPTC fields.

4.4 Converting Between EXIF and IPTC Date/Time Formats

It is sometimes necessary to copy EXIF date/time field values into IPTC date and time fields, and vice versa. EXIF date fields contain both the date and time, whereas IPTC fields hve separate fields for dates and times. To simplify this task, EXIFutils has been designed to automatically convert between EXIF and IPTC date time formats.

4.4.1 Setting IPTC Date and Time fields to the value of EXIF date/time fields

An IPTC date field (eg: the `ip-date` field) can be set to the date part of the EXIF `date-taken` field by simply assigning the EXIF field value to the IPTC field, for example:

```
exifedit /a "ip-date=[date-taken]" myfile.jpg
```

`exifedit` will automatically extract the date part of the `date-taken` field and convert it to the correct format for the `ip-date` field.

Similarly, an IPTC time field (eg `ip-time`) can be set to the time part of the EXIF `date-taken` field, for example:

```
exifedit /a "ip-time=[date-taken]" myfile.jpg
```

`exifedit` will extract the time part of the `date-taken` field and convert it to the IPTC time format. Note that EXIF date/time fields do not contain any time zone information, unlike IPTC time fields. `exifedit` allows you to add time zone information when setting an IPTC time field, for example:

```
exifedit /a "ip-time=[date-taken] +1000" myfile.jpg
```

4.4.2 Setting EXIF date/time fields to the value of IPTC date and time fields

EXIF date fields (eg `date-taken`, `date-modied`) contain both a date and a time portion. IPTC Meta data contains dates and times in separate fields (eg: `ip-date`, `ip-time`). `exifedit` allows you assign EXIF date fields to the combined value of IPTC date and time fields. For example, to set the EXIF `date-taken` field to the date and time specified in the `ip-date` and `ip-time` fields, use the following command:

```
exifedit /a "date-taken=[ip-date] [ip-time]" myfile.jpg
```

`exifedit` automatically converts the IPTC date and time fields into the format required by the EXIF `date-taken` field.

5 Character Sets

5.1 Introduction

A "character set" is an encoding scheme that defines how text characters are stored as binary values. There are many different "standard" character sets that can be used to store text data in files.

The EXIF Specification states that EXIF text fields are to be stored using the "7 bit ASCII" character set, which means that only unaccented English characters and punctuation marks can be used[2]. The IPTC Standard supports a wide variety of character sets, but the mechanism is limited.

As a result many image editing applications ignore the character sets required by the EXIF and IPTC Standards. Instead they store text data using extended character sets that allow the use of a wide range of non-English characters. It is not always possible to determine which character set was used to store the EXIF and IPTC data in an image file.

The character set most widely used for EXIF and IPTC fields is the Latin1 character set (ISO8859-1) which allows the representation of more than 40 Western European languages. EXIFutils therefore by default assumes that EXIF and IPTC fields are stored using Latin1, but provides the option to use different character sets if required.

The sections that follow describe how EXIFutils handles characters sets, and how the user can specify the character set to be used.

5.2 How EXIFutils Handles Character Sets

EXIFutils commands convert all character strings extracted from both EXIF and IPTC fields into a common character set for internal processing and for display. In EXIFutils terminology, this is called the **Command** character set. This is the character set that will be used when outputing text to the command terminal window or a file. It is also the character set that is used to interpret text files that are read by EXIFutils (eg when a template file is passed as a parameter to `exiflist`). The command character set must therefore match the character set that that the underlying operating system expects.

To correctly read, set, and display text strings, EXIFutils needs to know the character set to use for EXIF fields, IPTC fields, and the Command Character set. The default character sets used by EXIFutils are shown in Table 6. These defaults can be overridden using in the following ways:
- using the `/p` option on the command line
- setting EXIFutils environment variables

Table 6 Default Character Sets

Platform	EXIF Character Set	IPTC Character Set	Command Character Set
Microsoft Windows	LATIN1	LATIN1	ANSI Code Page[3] (except when `exiflist` is writing directly to the Command Prompt window, in which case the OEM Code Page is used).
Mac OSX			LATIN1 (ISO8859-1)
Linux			
Solaris			

---

[2] The EXIF comment field is an exception to this rule. It can be stored in either ASCII or UNICODE. Refer to Section 5.3 "EXIF Comment Field" for more information.
[3] On Windows, character sets are translated by Code Pages. There are two special code pages defined in the system; the default ANSI Code Page, and the OEM Code Page.

5.2.1 Using the `/p` Option to Specify Character Sets

The `exifcopy`, `exifedit`, `exiffile`, and `exiflist` commands all accept the `/p` option to specify the character sets to be used. The `/p` has the following form:

```
/p cmd=charset,exif=charset,iptc=charset
```

where `charset` is the name of a valid character set (or Code Page on Windows). Any of the three character set types (`cmd`, `exif`, or `iptc`) may be omitted, in which case they will take the default value, or the values specified via environment variables (see 5.2.2 "Using Environment Variables to Specify Character Sets"). Note that on the `exifedit` command, the `/p` options must be before the `/a` (add fields) option.

Table 7 shows commonly used character set names, including special values defined by EXIFutils. EXIFutils will accept the name or number of any Code Page that is present on the system. The only Code Pages that are valid Command (cmd=) character sets are ACP and OEM.

Table 7 Valid Character Set Names

Character Set Name	Comments
LATIN-1 or LATIN1	Code Page 28591 on Windows
UTF-7 or UTF7	
UTF-8 or UTF8	
MAC	Mac Roman character set. Commonly used on Mac OSX systems.
OEM	Default OEM Code Page (Windows only)
ACP	Default ANSI Code Page (Windows only)
number	The number of any Code Page that is present on the system (Windows only)
Special Values Defined by EXIFutils	
UNKNOWN	Character set is not known. EXIFutils will not perform any translation. Not valid as a Command Character set (i.e. `cmd=unknown` is not valid).
LOCALE	The default character set for the current locale (OSX, Linux, Solaris only)

The following are examples of valid `/p` option settings:

```
/p exif=utf8,iptc=mac
/p cmd=oem,exif=utf7,iptc=unknown
/p exif=latin1
/p iptc=unknown
```

While EXIFutils will accept any valid character set name (or Code Page number) only characters sets which meet the following criteria will function correctly:
- the lower order characters (0x00 to 0x7f) are the standard ANSI characters,
- there are no embedded null byes (i.e. null can be used to represent the end of the string).

5.2.2 Using Environment Variables to Specify Character Sets

If the same character sets are to be used repeatedly, environment variables can be used to permanently set the character set so that the `/p` option does not need to be included on every command.

Table 8 shows the environment variables used to set EXIFutils character sets. If an environment variable and the `/p` option are used, then the `/p` option overrides the environment variable.

Table 8 Character Set Environment Variables

Environment Variable	Meaning
`EXIFUTILS_CS_CMD=charset`	Equivalent to `/p cmd=charset`
`EXIFUTILS_CS_EXIF=charset`	Equivalent to `/p exif=charset`
`EXIFUTILS_CS_IPTC=charset`	Equivalent to `/p iptc=charset`

If both the `/p` option and the equivalent environment variable are specified, then the `/p` option setting is used.

5.2.3 Windows Batch (.BAT) Files and the /y Option

Problems can arise when using non-English characters in EXIFutils command line parameters within Windows .BAT files. Most text editors create text files (include .BAT files) using the ANSI Code Page, however Windows expects .BAT file to be created using the OEM Code Page. This means that some characters may not be interpretted correctly. If you find that a command works when entered in the Command Line windows, but does not work within a .BAT file then this is likely to be the cause.

The solution is to add the `/y` option as the first option on EXIFutils commands within batch files. The `/y` option tells the EXIFutils commands to translate the command line options so that they are interpretted correctly. The `/y` option is valid on the `exifedit`, `exiffile`, and `exiflist` commands.

5.2.4 Troubleshooting Character Set Problems

If EXIF or IPTC text values are not being displayed correctly, then it is likely that one or more characters sets have not been set correctly. The most likely problems is that the character set used to store the EXIF or IPTC value is different to the EXIFutils default character set (LATIN1). The most common character sets other than LATIN1 used in storing text values are UTF8 and MAC, the later being most likely if the file was created on a MacOS X System.

To determine if this is the case, try changing the character set to one of these other values. For example, if IPTC text fields are not display correctly, try one of the following:

```
exiflist /p iptc=mac myfile.jpg
exiflist /p iptc=utf8 myfile.jpg
```

If neither of these work, contact EXIFutils support for assistance (support@hugsan.com), sending a sample of the image file.

5.3 EXIF Comment Field

The EXIF comment field (nickname `comment`) can be stored using either plain ASCII text (which only allows Western European characters), or UNICODE (which supports a wide range of international characters)[4]. By default the comment field will be stored using ASCII.

To store the `comment` field using UNICODE, use the `/u` option on the `exifedit` command. For example:

```
exifedit /u /a comment=hello myfile.jpg
```

Alternatively, if you want exifedit to always use UNICODE for the comment field, set the `EXIFUTILS_UNICODE_COMMENT` environment variable to 'Y'. Refer to the documentation for you operating system for details of who to set environment variables.

Note that the character set used to store the EXIF comment field is not affected by the `/p exif=charset`, it is only affected by the `/u` option and the `EXIFUTILS_UNICODE_COMMENT` environment variable.

---

[4] The EXIF Specification also allows use of the JIS Japanese character set, but this is not supported by EXIFutils.

6 Templates

Templates are a powerfully feature that allows you to substitute field values (EXIF, IPTC, RMETA), and file attribute values into a character string. Three EXIFutils commands allow you to specify a template in place of a fixed character string (Table 9).

Table 9 Command Options That Accept Templates

Command	Option	Option Description	Use of Template
exifedit	/a	Add EXIF field to image	The value to which a field is set can be specified as a template.
exiffile	/n	Rename file	The name to which an image file is renamed can be specified as a template.
exiflist	/s	Set output template	The template defines the output format used to display fields.
	/t	Extract thumbnail	The template specifies the name of the file into which the thumbnail is extracted.
	/w	Extract audio stream	The template specifies the name of the file into which the audio stream is extracted.
	/e	Extract Meta data	The template specifies the name of the file into which the Meta data is extracted.

In its simplest form a *template* is a character string into which values are substituted. A template character string can contain:

1. markers that indicate where field values are to be inserted
2. formatting characters
3. other text

A *marker* is any valid EXIFutils field nickname surrounded by square brackets, eg "[f-number]". See Section 8 for a complete list of nicknames.

Formatting characters are special characters preceded by a back-slash character "\". Valid formatting characters are shown in Table 10.

Table 10 Template Formatting Characters

Character	Meaning
\n	New line character
\r	Carriage Return[5]
\t	Tab character
\\	Backslash character

The EXIFutils commands evaluate a template by scanning for markers and replacing them with the values of the corresponding fields. Any quote characters within a substituted field value will be preceded by a backslash escape character "\". If the field name specified in the marker is a valid field name, but that field is not present in the image file, then a empty string is substituted. Formatting characters are replaced with the corresponding format character. Any sequence of characters surrounded by square brackets that is not a recognized nickname will be left unchanged.

---

[5] Carriage return characters are used to indicate a new line on MacOS X systems.

Example 1

The `exifedit` command below sets the value of the `comment` field based on the value of the `shutter` speed and `f-number` fields:

```
exifedit /a "comment=Shutter: [shutter]\tF-stop: [f-number]\n" photo.jpg
```

If the value of the `shutter` field is "`1/125`", and the value of the `f-number` field is "`5.6`", then when the above template is evaluated, the `comment` field will be set to the following string:

```
Shutter: 1/125,    F-stop: 5.6
```

Example 2

The `exiffile` command below renames an image file so that the new file name contains the camera model followed by the original file name:

```
exiffile /n [model]-[file-name] photo.jpg
```

If the value of the `model` field is "`NIKON D1X`", then the resulting file name will be:

```
NIKON D1X-photo.jpg
```

6.1 Sectioned Templates

To provide greater control over the output format when displaying fields from multiple files, the `exiflist /s` option accepts a more advanced form of template, called a *sectioned template*. A sectioned template has all the features of a basic template but in addition can be divided into three sections:
- o   The *head* section, which contains text that is to be displayed once, before fields from any file are displayed
- o   The *file* section, which contains text that is to be displayed once for each file
- o   The *tail* section, which contains text that is to be displayed once, after all files have been displayed

These sections allow header and trailer information to be displayed before and after the details of the files being displayed.

Section markers in the template indicate the beginning of each section:

```
[EXIF-HEAD]

lines to be display once, before the first image file is displayed

[EXIF-FILE]

lines to be displayed once for each image file that is displayed

[EXIF-TAIL]

lines to be display once, after the last image file has been displayed
```
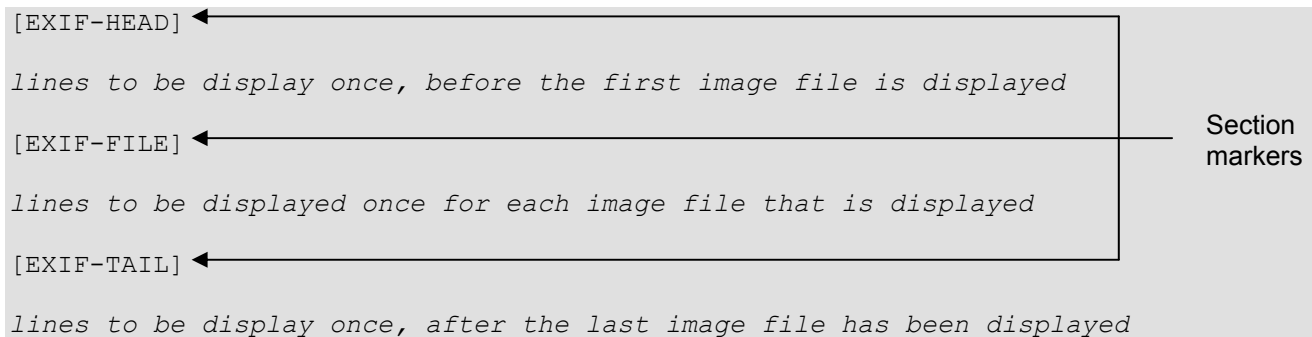
Section markers

Any section can be omitted if not required. If no section markers are included, then all lines in the template are considered to be in the *file* section. The section markers are not shown in the resulting output.

Example 3

The commands and templates below produce an HTML page that contains a table with headings on each column, and one row for each image file in a directory. Each row will contain the image file name as a web link, the time the image was taken, its file size, and image resolution. The following `exifedit` command and template will achieve this:

```
exifedit /o t /s @template.txt mydir > photolist.html
```

`template.txt` contains:

```
[EXIF-HEAD]
<HTML>
<HEAD>My Photographs</HEAD>
<TABLE ID="Table1" BORDER=1 CELLSPACING=3 CELLPADDING=1 WIDTH=725>
<TR>
  <TD>File Name</TD>
  <TD>Date/Time</TD>
  <TD>File Size</TD>
  <TD>Dimensions</TD>
</TR>
[EXIF-FILE]
<TR>
  <TD><a href="[file-name-full]">[file-name]</a></TD>
  <TD>[date-taken]</TD>
  <TD>[file-size]</TD>
  <TD>[width]x[height]</TD>
</TR>
[EXIF-TAIL]
</TABLE>
</HTML>
```

Sample output from the above command and template run on a directory containing two files could be as follows:

```
<HTML>
<HEAD>My Photographs</HEAD>
<TABLE ID="Table1" BORDER=1 CELLSPACING=3 CELLPADDING=1 WIDTH=725>
<TR>
  <TD>File Name</TD>
  <TD>Date/Time</TD>
  <TD>File Size</TD>
  <TD>Dimensions</TD>
</TR>
<TR>
  <TD><a href="mydir/photo1.jpg">photo1.jpg</a></TD>
  <TD>2003:01:01 11:35:58</TD>
  <TD>65848</TD>
  <TD>1760x1168</TD>
</TR>
<TR>
  <TD><a href="mydir/photo2.jpg">photo2.jpg</a></TD>
  <TD>2003:01:01 11:40:00</TD>
  <TD>63458</TD>
  <TD>1760x1168</TD>
</TR>
</TABLE>
</HTML>
```

Example 4

You want to display one line per file, starting with the file name, a colon, then a list of fields separated by semicolon characters. A template to produce this out would look like this:

```
exiflist /o t /s "[file-name]: [make];[model];[shutter];[f-number]\n" .
```

Sample output from this command is:

```
photo1.jpg: NIKON;E995;1/125;2.8
photo2.jpg: NIKON;E995;1/64;5.6
photo3.jpg: NIKON;E995;1/125;2.8
```

7   Command Reference

7.1 EXIFCOPY

7.1.1 Description

In its simplest form the `exifcopy` command is used to copy Meta data (EXIF, IPTC, Flashpix) unmodified from one image file (the *source* file) to another image file (the *destination* file). For example:

```
exifcopy source.jpg dest.jpg
```

By default a backup copy of the destination file is kept. The name of the backup file will contain the suffix '`-be`' appended to the file name immediately before the '.' in the file name. For example, if the destination file name was `myphoto.jpg`, the backup file will be called `myphoto-be.jpg`. If you do not want a backup file, use the `/b` option.

If the destination file already contains Meta data, `exifcopy` will refuse to copy any Meta data. To force `exifcopy` to overwrite any Meta data in the destination file, use the `/o` option. This will cause any Meta data in the source file to overwrite Meta data in the destination file, IPTC data in the source file will replace IPTC data in the destination file, and Flashpix data in the source file will replace Flashpix data in the destination file. If a particular type of Meta data is not present in the source file, the corresponding data in the destination file will be left unchanged.

For example, if the `image1.jpg` contains only EXIF data and the `image2.jpg` contains only IPTC data, then the command:

```
exifcopy /o image1.jpg image2.jpg
```

will copy the EXIF data from `image1.jpg` into `image2.jpg`, and will leave the IPTC data in `image2.jpg` unchanged[6].

7.1.1.1 Advanced Use

`exifcopy` can be used to copy Meta data (EXIF, IPTC, and Flashpix) between multiple image files in one command. This is achieved by specifying:
   o   both the source and the destination as directory names
   o   the source as a single file and the destination as a directory name

The selection of the source and destination files between which Meta data will be copied is controlled by the `/m` (match) option. The `/m` option specifies how many characters, counting from the left of the source file name, must be the same in the destination file name before copying will occur; if the file names match for the specified number of characters then the EXIF data will be copied between the files.

The `/m` option can be specified in two ways:
   1. as the number of characters that must match (eg. `/m 8`)
   2. as a dot (`/m .`) indicating that the files much match up to the first '.' in the source file name. For example, suppose the source file is `myphoto.jpg` and the possible destination files are `myphoto1.jpg` and `mypic.jpg`. Meta data will only be copied to `myphoto1.jpg` because there are seven characters before the '.' in the source file name, and `myphoto1.jpg` matches the source file name for the first seven characters.

---

[6] If you want to separately delete EXIF, IPTC, or Flashpix information from an image file, use the exifedit command with the `/e` option. See Section 7.3 for more details.

If no `/m` option is specified then the file names must match exactly for the Meta data to be copied.

Specifying a match length of zero (`/m 0`) causes all sources files to match all destination files. This is only useful when the source is a single file and the destination is a directory. In this scenario, specifying `/m 0` causes the EXIF data from the single source file to be copied into all the JPG files in the destination directory.

7.1.1.2 Supported Image File Types

For some file types it is possible to make an exact copy of all EXIF, IPTC, and Flashpix data from one file to another. For other file types only fields that can be edited[7] by the EXIFutils can be copied between files.

Table 11 shows the image file types that support exact copying of all Meta data. Note that Minolta MRW files can only be the source file for an exact copy operation, not the destination file.

Table 11 File types for which exact copy is supported

File Type	Exact copying of all EXIF fields supported	Exact copying of all IPTC fields supported	Exact copying of all Flashpix data supported
JPEG	✓	✓	✓
TIF			
EXIF .EXI	✓	✓	✓
Canon .CRW			
Canon .CR2			
EPS			
Fujifilm .RAF			
Kodak .DCR			
Minolta .MRW	✓ (Note 1)		
Nikon .NEF			
EPS			

Note 1: An .MRW file can only be the *source* of the copied fields. Copying of field *into* an .MRW file is not supported

If both source and destination files support exact copies then by default an *exact* copy of *all* Meta data in the source file will be copied into the destination file. If the destination file already contains Meta data, `exifcopy` will not overwrite it unless the `/o` option (force overwrite) option is specified. If the `/f` option is specified then only the fields listed in the `/f` option will be copied (see below).

Performing an exact copy of all fields is not supported if the source file, destination file, or both do not support exact copying. In these cases only fields that EXIFutils considers to be editable[8] can be copied[9].

If you do not want to make an exact copy of all fields, or if exact copying is not supported for your file type, you can copy individual fields using the `/f` option. The `/f` option is used to specify a list of the nicknames of the fields to be copied, eg:

```
/f make,model,description,shutter
```

---

[7] See Section 7.3.1.1 "Editable and non-Editable Fields" for an explanation of editable fields.
[8] See EXIFutils Field Reference Guide for a list of fields that are editable.
[9] You can force `exifcopy` to copy only selected fields between files that support exact copying by specifying the `/f` option.

If the `/f` is not specified then by default all `exif-common` and `iptc` fields are copied. See Section 3.1 "Selecting Multiple Fields" for a description of `exif-common` and `iptc`.

`exifcopy` does not check that the Meta data being copied is consistent with the image file into which it is being copied.

7.1.1.2.1 *Canon Raw (.CRW) Files*

Canon Raw .CRW files do not contain EXIF data; they contain Canon proprietary Meta data. If a .CRW files is the source of an `exifcopy` operation then the .CRW Meta data will be copied into the equivalent EXIF field in the destination file. If there is no equivalent EXIF field then the .CRW field is not copied. Table 12 shows the equivalent EXIF field for each .CRW field. Note that in some cases there is more than one EXIF field corresponding to a Canon .CRW field. In these cases the Canon field will be copied into all equivalent EXIF fields. For example, the Canon `crw-shutter` field value will be copied into both the `exp-time` and `shutter` EXIF fields.

A Canon .CRW file cannot be the destination of an `exifcopy` operation.

Table 12 Canon .CRW to EXIF Field Translations

Canon .CRW Field	Equivalent EXIF Field	Description
`crw-vendor`	`make`	Camera Make
`crw-model`	`model`	Camera Model
`crw-date`	`date-taken`	Date Taken
`crw-firm-ver`	`firm-ver`	Firmware Version
`crw-iso`	`iso-speed`	ISO Speed Setting
`crw-exp-comp`	`exp-bias`	Exposure Compensation
`crw-shutter`	`shutter`	Shutter Speed
	`exp-time`	Exposure Time
`crw-aperture`	`aperture`	Aperture
	`f-number`	F-number

7.1.2 Command Syntax

```
exifcopy [/b]            [/o] [/q] [/f field-list] \
                                [/p cmd=charset,exif=charset,iptc=charset] \
                                             src-file dest-file

exifcopy [/b] [/c] [/I] [/o] [/q] [/f field-list] \
                                [/p cmd=charset,exif=charset,iptc=charset] \
                                             src-file dest-directory

exifcopy [/b] [/c] [/I] [/o] [/q] [/f field-list] \
                                [/p cmd=charset,exif=charset,iptc=charset] \
                                         src-directory dest-directory
exifcopy [/v|/h|/?]
```

/b   Do not save a backup copy of the original destination file(s).

/c   File name comparisons are to be case-sensitive (this is the default on Linux, MacOS X, and Solaris).

/f *field-list*
            Copy only the fields specified in *field-list* from the source to the destination file(s).

`/h`	Display `exifcopy` usage information
`/i`	File name comparisons are to be case-insensitive (this is the default on Windows)
`/m [.|`*n*`]`	Specifies the number of characters that must match between the source file name and destination file name before Meta data will be copied. '`/m  .`' specifies that the file names must match up to the position of the first '.' in the source file name.
`/o`	Force overwriting of EXIF data in the destination file.

`/p [cmd=xxx],[exif=xxx],[iptc=xxx]`

> Specify the character sets to be used when interpreting/displaying text fields
>
> > `cmd=xxx` sets the charset to be used for output displayed from this command.
> > `exif=xxx` sets the charset to be used for reading/writing EXIF text fields
> > `iptc=xxx` sets the charset to be used for reading/writing IPTC text fields
>
> Any of the three may be omitted. For example:
>
> ```
> /p exif=latin1,iptc=mac
> /p cmd=utf8
> ```
>
> These values can also be set using the `EXIFUTILS_CS_CMD`, `EXIFUTILS_CS_EXIF`, `EXIFUTILS_CS_IPTC` environment variables.
>
> See Section 5 "Character Sets" for more information.

`/q`	Quiet mode. Do not display warning messages.
`/v`	Display program version information. This is the default action if no other options are present.
`/?`	Display `exifcopy` usage information.

7.1.3 Examples

```
exifcopy Dcp_0123.jpg Dcp_0123_new.jpg
```

> Takes an exact copy of all Meta data (EXIF, IPTC, Flashpix) from `Dcp_0123.jpg` and copies it into `Dcp_0123_new.jpg`. An unaltered copy of `Dcp_0123_new.jpg` will be left in the current directory with the name `Dcp_0123_new-be.jpg`. If `Dcp_0123_new.jpg` already contains Meta data then an error will be displayed and `Dcp_0123_new.jpg` will be left unaltered.

```
exifcopy /o /b Dcp_0123.jpg Dcp_0123_new.jpg
```

> Copies the Meta information from `Dcp_0123.jpg` into `Dcp_0123_new.jpg`. If `Dcp_0123_new.jpg` already contains Meta information then it will be overwritten (`/o` option). No backup copy of `Dcp_0123_new.jpg` will be kept (`/b` option).

```
exifcopy /f date-taken,f-number,ip-caption Dcp_0123.jpg Dcp_0123.tiff
```

Copies the `date-taken` and `f-number` EXIF fields, and the `ip-caption` IPTC field from `Dcp_0123.jpg` into `Dcp_0123.tiff`. If `Dcp_0123.tiff` already contains any of these fields then they will be overwritten. An unaltered copy of `Dcp_0123.tiff` will be left in the current directory with the name `Dcp_0123-be.tiff`.

```
exifcopy PICT0123.mrw PICT0123.jpg
```

Takes an exact copy of all Meta information from `Dcp_0123.mrw` and copies it into `Dcp_0123.jpg`. An unaltered copy of `Dcp_0123.jpg` will be left in the current directory with the name `Dcp_0123-be.jpg`. If `Dcp_0123.jpg` already contains Meta information then an error will be displayed and `Dcp_0123.jpg` will be left unaltered.

7.2 EXIFDATE

7.2.1 Description

The `exifdate` command modifies all EXIF date/time fields in the specified image files. If the specified file is a directory then the date fields in all image files in that directory will be modified.

The way in which the date is modified is governed by the action parameter. Valid actions are:
- Add (`/a`)   the specified date/time value will be *added* to every EXIF date/time field
- Subtract (`/s`)   the specified date/time value will be *subtracted* from every EXIF date/time field
- Replace   *replace* some or all of the EXIF date/time with a specific value. This is the default action if neither `/a` or `/s` is specified.

The value to *add to*, *subtract from*, or *replace with* is specified by the date/time parameter.

The format of the date/time parameter is:

```
yyyy:mm:dd hh:mm:ss
```

Note that when a full date/time is specified on the command line, quote characters must surround it. For example,

```
exifdate "2001:03:16 12:23:00" image.jpg
```

The quotes are required because the date/time contains an embedded blank.

Either the date or time portion can be omitted, so both of the following formats are also valid:

```
yyyy:mm:dd          eg. 2001:03:16
hh:mm:ss            eg. 01:00:00
```

If the action is *Replace*, any portion of the date or time can be replaced with x's to indicate that part of the field is not to be replaced. For example, in the command

```
exifdate 1999:xx:xx image.jpg
```

the date parameter indicates that the year field is to be set to 1999, but the month and day are to be left unchanged. The time will also be left unchanged because the time part of the date/time was not specified.

7.2.1.1 Supported Image File Types

Table 13 shows the files types that are supported by `exifdate`.

Table 13 File Types Support by exifdate

File Type	Supported by exifdate
JPEG	✓
TIF	✓
EXIF .EXI	✓
Canon .CRW	
Canon .CR2	✓
EPS	
Fujifilm .RAF	✓
Kodak .DCR	✓
Minolta .MRW	✓
Nikon .NEF	✓

7.2.2 Command Syntax

```
exifdate /a [/q] [/r] date-time file,... directory,...
exifdate /s [/q] [/r] date-time file,... directory,...
exifdate    [/q] [/r] date-time file,... directory,...
exifdate [/h|/v|/?]
```

/a   Add *date-time* to all EXIF date fields in the specified image files.

/h   Display `exifdate` usage information.

/q   Quiet mode. Do not display warning messages.

/r   Include subdirectories. If any directories are specified, then dates in all image files in the specified directory and all of its subdirectories will be modified.

/s   Subtract *date-time* from all EXIF date fields in the specified image files.

/v   Display program version information. This is the default action if no other options are present.

/?   Display `exifdate` usage information.

7.2.3 Examples

```
exifdate "1999:06:01 14:27:08" image1.jpg image2.jpg
```

Set the date fields in `image1.jpg` and `image2.jpg` to `1999:06:01 14:27:08`

```
exifdate "xxxx:06:xx" my-dir1 mydir2
```

Change the month to 06 in all date fields in image files in the directories `my-dir1` and `mydir2`.

```
exifdate /a "0001:03:05" image.jpg
```

Add 1 year, 3 months, and 5 days to all date/time fields in `image.jpg`.

```
exifdate /a "01:30:00" image.jpg
```

Add 1 hour and 30 minutes to all date/time fields in `image.jpg`.

```
exifdate /r /s "12:00:00" my-dir
```

Subtract 12 hours from the date/time fields of all image files in directory `my-dir` and all of its subdirectories (`/r` option).

7.3 EXIFEDIT

7.3.1 Description

The `exifedit` command adds, modifies, and deletes EXIF and IPTC fields from image files. The edit action to be performed is specified by one or more of the following command line options:

- `/a` Add one or more EXIF or IPTC fields. The fields to be added, and their values, are specified in a field value list following the `/a` option. Fields already existing in the image file will have their value replaced with the specified value. See Section 7.3.1.2.
- `/r` Remove one or more EXIF or IPTC fields. The fields to be removed are specified as a field list following the `/r` option. See Section 7.3.1.3.
- `/s` Update the EXIF `width` and `height` fields to match actual image values (JPEG files only). See Section 7.3.1.4.
- `/t` Remove or update EXIF thumbnail image. See Section 7.3.1.4.
- `/e` Erase all EXIF, IPTC, and/or Flashpix information from the file (JPEG and .EXI files only). See Section 7.3.1.5.

By default a copy of the original (unedited) image file will be saved with a '`-be`' suffix. For example, if you edit the file `myphoto.jpg` then a backup will be saved with the name `myphoto-be.jpg`. Use the `/b` option if you do not want the backup file created.

7.3.1.1 Editable and non-Editable Fields

Editable fields are fields for which EXIFutils can change the value. EXIFutils does not allow the user to edit all EXIF and IPTC fields for one or more of the following reasons:

1. The value of some fields must be generated by EXIFutils to ensure correct formatting of the EXIF and IPTC data structures.
2. EXIFutils does not yet support formatting of the data type in which the field is stored.
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 Section 8 and the EXIFutils Field Reference Guide.

7.3.1.2 Adding Individual EXIF and IPTC Fields (`/a` option)

The `exifedit /a` option is used to add EXIF and IPTC fields to an image file. 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 EXIFutils Getting Started Guide for an explanation of how to find the nickname of a 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
```

Note that if the field value contains a space character, or if you include one or more spaces before or after the "=", then the whole nickname=value string must be surrounded by quotes, eg:

```
exifedit /a "date-taken=2004:01:01 23:59:59" myphoto.jpg
```

Also, if the field value contains a comma or a semicolon, then it is necessary to put quotes[10] around both the field value and the whole nickname=value string. To do this you must escape the embedded quote characters[11]:

```
exifedit /a "comment=\"I took this, for sure\"" myphoto.jpg
```

To set multiple EXIF and/or IPTC fields in one command, you can specify mutltiple nickname/value pairs in the `/a` option, separated by commas, i.e.

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

As before if there are spaces anywhere in the nickname=value string, or if a field value contains a comma or a space, then the whole string must be surrounded by quotes, eg:

```
exifedit /a "shutter=1/125, comment=\"I took this, for sure\"" myphoto.jpg
```

7.3.1.2.1 Adding Repeating IPTC Fields

All EXIF fields and most IPTC fields can only appear once in an image file. For example, you can only put one EXIF `description` field in an image. If you add a description field when one is already present, EXIFutils will delete the existing `description` field and replace it with the new description.

Some IPTC fields can occur more than one, for example the Keyword field (nickname `ip-keyword`) and Supplementary Category field (nickname `ip-suppcat`). Repeating IPTC fields can appear up to 999[12] times within an image file. See the EXIFutils Field Reference Guide for information about which IPTC fields can be present more than once.

Each time a repeating field is added to a file, a new instance of that field is added to the file. For example, if you run the following two commands one after the other, there will be two `ip-keyword` fields in the file:

```
exifedit   /a ip-keyword=sports myfile.jpg
exifedit   /a ip-keyword=soccer myfile.jpg
```

When you display a repeating field with `exiflist`, it will display all of the instances that are in the file. For example:

```
C:>exiflist /o ln /f ip-keyword myfile.jpg
ip-keyword="sport; soccer"
```

You can add multiple repeating values in one command by using one of the following formats:

```
exifedit /a ip-keyword=sports,ip-keyword=soccer myfile.jpg
exifedit /a "ip-keyword=sports;soccer" myfile.jpg
```

These two commands have exactly the same result, and each is equivalent to the two commands shown in the initial `exifedit` example above.

By default, a semicolon is used to separate multiple repeating field values. You can change this separator character using the `/j` option.

---

[10] See also the `exifedit /c` option, which can be used to change the quote character used when quoting `exifedit` field values.

[11] The examples given in this section apply to the Windows version of EXIFutils and to the OSX, Linux, and Solaris versions of the product when used with a Bourne-based command shell. The method used to embedded quotes when using other command shells may be different.

[12] The limit of 999 repetitions is imposed by EXIFutils. According to the IPTC specification the number of times a field can be repeated is limited only by available memory.

7.3.1.2.2 *Setting Field Values Using the Value of Other Fields*

Using *template* values, you can set fields using the values of other fields. For example, if you have a description of a photo in the EXIF `description` field, and you want to copy this value into the IPTC `ip-caption` field, you can do the following:

```
exifedit /a "ip-caption=[description]" myfile.jpg
```

You can also combine multiple fields into one value, for example:

```
exifedit /a "ip-caption=Photo taken at [date-taken], F-stop [f-number]" myfile.jpg
```

See also Section 4.4 "Converting Between EXIF and IPTC Date/Time Formats" for more information on setting EXIF date/time fields based on IPTC date/time values, and vice versa.

7.3.1.3 Removing Individual EXIF or IPTC fields (`/r` option)

The `exifedit /r` option is used to remove individual EXIF and IPTC fields from an image file. To do this you need to know the nickname of the field you want to remove. See EXIFutils Getting Started Guide for an explanation of how to find the nickname of a field.

Once you know the nickname of the field(s) you want to remove, enter the following command:

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

For example, to remove the EXIF description field, and the IPTC caption field, enter the following command:

```
exifedit /r description,ip-caption myfile.jpg
```

To remove all EXIF and/or IPTC fields, see Section 7.3.1.5 "Erasing all Meta data (/e option)"

7.3.1.3.1 *Removing Repeating IPTC Fields*

As explained in Section 7.3.1.2.1, some IPTC fields can be present multiple times in an image file. If you remove either of these fields using the `exifedit /r` option, all occurrence of the field will be removed.

For example, if the file `myfile.jpg` contains two occurrences of the `ip-keyword` field added by the command:

```
exifedit /a "ip-keyword=planes,ip-keyword=planes" myfile.jpg
```

then the following command will delete both occurrences of the `ip-keyword` field:

```
exifedit /r ip-keyword myfile.jpg
```

EXIFutils do not provide the option to delete individual occurances of a repeating IPTC field.

7.3.1.4 Updating EXIF fields to match the actual image (`/s` and `/t` options)

Many photo editing programs do not update the EXIF image information when you save an image after editing it. EXIFutils provides the `exifedit /s` and `/t` options update the EXIF fields.

The `/s` option is used to set the EXIF image `width` and `height` values to the actual size of the main image. The `/t` option is used update the EXIF thumbnail image to match the main image. The `/s` and `/t` options can be used either together or separately.

For example:

```
exifedit /s myfile.jpg
```

```
exifedit /t a myfile.jpg
```

```
exifedit /s /t a myfile.jpg
```

The `exifedit /t a` option creates a thumbnail with the default dimensions of 160x120. See Section 7.3.2 for details of how to change the size of the generated thumbnail.

7.3.1.5 Erasing all Meta data (`/e` option)

The `exifedit /e` option is used to delete all Meta data from a JPEG image file. It can also be used to selectively remove only EXIF Meta data, IPTC Meta data, or Flashpix Meta data from a JPEG file.

To delete all Meta data (EXIF, IPTC, and Flashpix) use the '`/e a`' option. For example:

```
 exifedit /e a myfile.jpg
```

To delete all EXIF Meta data, but leave IPTC and Flashpix Meta data, using the '`/e e`' option. For example:

```
exifedit /e e myfile.jpg
```

To delete all IPTC Meta data, but leave EXIF and Flashpix Meta data, using the '`/e i`' option. For example:

```
exifedit /e i myfile.jpg
```

To delete all Flashpix Meta data, but leave EXIF and IPTC Meta data, using the '`/e f`' option. For example:

```
exifedit /e f myfile.jpg
```

Deletion of Ricoh RMETA Meta data is not supported.

7.3.1.6 Supported Image File Types

Table 14 shows the image file types supported by `exifedit`.

Table 14 Image File Types Supported by exifedit

File Type	`/e` option	`/s` option	All other options
JPEG	✓	✓	✓
EXIF .EXI	✓		✓
TIF			✓
Canon .CR2			✓
Kodak .DCR			✓
Nikon .NEF			✓
Canon .CRW			
Fujifilm .RAF			
Minolta .MRW			
EPS			

7.3.2 Command Syntax

```
exifedit [/y] [/b] [/q] [/i] [/s] [/u] [/c x] [/j x] \
                          [/p cmd=charset,exif=charset,iptc=charset] \
                          [/a field-value-list|@filename] \
                          [/r field-list] \
                          [/t [r|a|a,size|a,wwwxhhh|a,@filename]] file...
exifedit [/b] [/q] [/i] /e [a|e|f|i] file...
exifedit [/h|/v|/?]
```

   /a [*field-value-list* | @*file-name* | @-]

> Add the specified field(s) to the image file(s). The *field-value-list* is specified as a comma separated list of field nickname/value pairs in the following format:

> /a   *fieldname=fieldvalue*,*fieldname=fieldvalue*

> For example:

> /a "description=I took this,shutter=1/125,f-number=2.8"

> The *fieldvalue* can also be specified as a template. See Section 6 "Templates" for more details.

> Alternatively, the name of a file containing the *field-value-list* in the above format can be specified. For example:

> /a @my-field-values.txt

> The file name can also be specified as '-' which indicates that the *field-value-list* will be read from stdin. For example:

> /a @-

   /b   Do not keep a backup copy of the original unedited image file(s).

   /c *x*   Specifies the character to be used as the quote character in the field value list. '*x*' can be any printable character except " or \. For example

> /c : /a "description=:My birthday, last year:"

> sets the quote character to the colon character and uses it to delimit the text value of the description field.

   /e [a|e|f|i]

> Erase Meta data from the file. The types of Meta data to be removed are specified by the sub-parameter:
> /e a   Erase all EXIF, IPTC, and Flaspix Meta data.
> /e e   Erase all EXIF data. All APP1 data blocks will be removed.
> /e f   Erase all Flaspix data. All APP2 FlashPix data blocks will be removed.
> /e i   Erase all IPTC data. All APP13 data blocks will be removed.

> This option is only valid for JPEG files. It has no effect on other file types. This option cannot be specified with the /a, /r, /t, or /s options.

/h   Display `exifedit` usage information.

/i   Recursive mode. If any of the files specified is a directory, then image files in the specified directory and all of its subdirectories will be processed.

                    CAUTION SHOULD BE TAKEN WHEN USING THIS OPTION AS IT CAN POTENTIALLY MODIFY A LARGE NUMBER OF FILES.

/j [*x*|*0xnn*|*0nnn*)

                    Specify the field separator character to be used to separate repeating IPTC fields in the /a option. This can be specified in one of three ways:
- As a printable character, for example /j +
- As a hexadecimal value, for example /j 0x10
- As an octal value with a leading zero, for example /j 020

                    The default value is a semicolon ';'

/p [cmd=xxx],[exif=xxx],[iptc=xxx]

                    Specify the character sets to be used when interpreting/displaying text fields

                    `cmd=xxx`   sets the charset to be used for output displayed from this command.
                    `exif=xxx`   sets the charset to be used for reading/writing EXIF text fields
                    `iptc=xxx`   sets the charset to be used for reading/writing IPTC text fields

                    Any of the three may be omitted. For example:

```
/p exif=latin1,iptc=mac
/p cmd=utf8
```

                    These values can also be set using the `EXIFUTILS_CS_CMD`, `EXIFUTILS_CS_EXIF`, `EXIFUTILS_CS_IPTC` environment variables.

                    See Section 5 "Character Sets" for more information.

/q   Quiet mode. Do not display warning messages

/r *field-list*

                    Remove the specified EXIF and/or IPTC fields. If a repeating IPTC field is specified (`ip-keyword` or `ip-suppcat`) then all occurances of that field will be deleted. The field list is specified as a comma separated list of field nicknames in the following format:

```
/r  fieldname,fieldname,fieldname,fieldname
```

                    For example:

```
/r description,shutter,f-number,comment
```

                    Alternatively, the name of a file containing the *field-list* in the above format can be specified. For example:

```
/r @my-field-list.txt
```

                    The file name can also be specified as dash '-' which indicates that the *field-list* should be read from stdin. For example:

```
/r @-
```

/s   Set the EXIF width and height fields for the main image to match the actual width and height of the main JPEG image.

This option can only be used on JPEG files. It has no effect on other file types.

/t [a|a,*size*|a,*wwxhh*|a,@*filename*|r]
The '/t a' option replaces an existing thumbnail image (if any) with either a thumbnail provided by the user, or one generated from the main JPEG image by exifedit. If a thumbnail is to be generated, the size of the generated thumbnail image can be specified in one of three ways:

/t a   The generated thumbnail will be the default size 160 pixels wide by 120 pixels high. This size conforms to the DCF V1.0 specification and therefore many digital cameras and image processing programs expect the thumbnail to be this size.

/t a,*size*   The specified *size* is the size (in pixels) of the longest dimension of the thumbnail image. The size of the other dimension will be scaled to maintain the aspect ratio of the image. For example, if you specified /t a,100 and the size of the main image is 1000x500, then the thumbnail dimensions will be 100x50. Using the same thumbnail specification /t a,100 with a main image size of 500x1000, then the thumbnail dimensions will be 50x100.

/t a,*wwxhh*   The thumbnail dimensions will be *ww* pixels wide by *hh* pixels high, eg
/t a,200x100

If the thumbnail is to be replaced with a JPEG image provided by the user, then it is specified as follows:
/t a,@*filename*
The thumbnail will be replaced with the image in the specified filename. The specified thumbnail file must be in the same directory as the image file, and is checked to ensure that it is a JPEG file.

The /t r option removes any existing EXIF thumbnail image and all thumbnail related EXIF fields.

The /t option can only be used on JPEG files. It has no effect on other file types.

/u   Store EXIF comment field as UNICODE (default is ASCII). See Section 5.3 "EXIF Comment Field" for more information.

/v   Display program version information. This is the default action if no other options are present.

/y   Used when invoking this command from a .BAT file that has been created with an ANSI text editor. This option translates the command parameters so that non-English characters are interpretted correctly. If present this option MUST be the first option on the command.

/?   Display exifdate usage information.

7.3.3 Examples

```
exifedit /a "copyright=Copyright (c) 2001 John Citizen" my-dir
```

Add the `copyright` field to all image files in the directory `my-dir`. If the copyright field is already present in any of the files, it will be replaced with the value specified. A backup copy of all edited files will be created.

```
exifedit /r comment,description,ip-keyword myfile.jpg
```

Removes the `comment`, `description`, and all instances of the `ip-keyword` field from `myfile.jpg`.

```
exifedit /t r mydir fred.jpg
```

Removes the thumbnail images and EXIF Thumbnail fields from all the JPEG files in the directory `mydir`, and from the file `fred.jpg` in the current directory.

```
exifedit /t a,@fred-thumb.jpg mydir fred.jpg
```

Replaces the thumbnail image in `fred.jpg` with the image in `fred-thumb.jpg`.

```
exifedit /c : /a "comment=:my photo:" /t a /r copyright mydir
```

Performs the following changes to all JPEGs in the `mydir` directory:
- o adds the comment field with the value `'my photo'` (`/a` option)
- o replaces any existing EXIF thumbnail image with a new thumbnail based on the main JPEG image. (`/t` option)
- o removes the copyright field (`/r` option)

An alterative quote character ':' is used (`/c` option).

```
exifedit /a @fields.txt myfile.jpg
```

Adds the fields/values specified in the file `fields.txt` (located in the current directory) into the JPEG file `myfile.jpg`

Sample contents of `fields.txt` is show below:

```
copyright="Copyright (c) Jane Citizen.",
description="Loch Ness in winter",
comment="This is a photo I look of Loch Ness in winter.
The comment spans more than one line, but that is OK
because exifedit will replace each new line character
with a space."
```

```
exifedit /a "comment=Taken at [date-taken] by [ip-byline]" myfile.jpg
```

Adds the `comment` field to `myfile.jpg`. The value of the comment field is generated using a supplied substitution template. If the `date-taken` field has a value of '2000:12:31 23:59:59' and the `ip-byline` field has value of "Jane Smith", then in the above example the comment field will be set to:

"Taken at 2000:12:31 23:59:59 by Jane Smith".

```
exifedit /a "ip-headline=Joe Triumphs,ip-keyword=sport,keyword=olympics" myfile.jpg
```

Adds the IPTC `ip-headline` field, and two instances of the IPTC `ip-keyword` field to `myfile.jpg`.

7.4 EXIFFILE

7.4.1 Description

The `exiffile` command is used to change the attributes of an image file based on the value of EXIF, IPTC, and RMETA fields. The operation to be performed by `exiffile` is selected by one of the following command line options:

`/n`	Rename one or more image files based on field values
`/t`	Change the "last modified" timestamp of one or more images files to match the date/time that each image was taken.

Both the `/n` and `/t` options can be specified on the same command.

7.4.1.1 Renaming Files

`exiffile` renames image files based on a file name *template* specified in the `/n` option. A template is a text string containing markers indicating where field values are to be substituted. A marker consists of an EXIFutils field nickname surrounded by square brackets "[ ]". For example, if you wanted to rename an image file so that the file name was the same as the date/time the image was taken, then you would use the following command:

```
exiffile /n "[date-taken].jpg" myphoto.jpg
```

You can use any EXIFutils field nickname in the template. See Section 8 for a complete list of nicknames. Templates are described in more detail in Section 6 "Templates".

To ensure that the resulting file name is valid, `exiffile` will replace any illegal characters with a dash "-". You can change this substitution character to a different character using the `/c` option. Characters that are invalid in a file name are /:*?\"<>|

If you specify the `/s` option, `exiffile` will also replace any space characters in the file name with the substitution character.

7.4.1.1.1 File Name Clashes

When attempting to rename a file, `exiffile` first checks to see if a file with that name already exists. If it does, then `exiffile` will add a suffix to the name to ensure that the name is unique. The suffix is a number surrounded by brackets, eg "(1)". For example, if a file is to be renamed to "2004-01-01-12-23-23.jpg", but a file with that name already exists, `exiffile` will rename the file to "2004-01-01-12-23-23(1).jpg". If that file name also exists, `exifile` will attempt to rename it to "2004-01-01-12-23-23(2).jpg", and so on.

7.4.1.2 Changing the "Last Modified" Date

When the `/t` option is specified `exiffile` will, for each image, attempt to set the last modified date of the file to be the same as the value of the `date-taken` field. If the `date-taken` field is not present in the image file then the last modified timestamp will be set to the value of the `date-digi` (date digitised) field. If the `date-digi` field is not present in the image file then the last modified timestamp will be set to the value of the `date-mod` (date modified) field.

If none of the above date fields is present in the image file then an error is displayed and no change is made to the last modified date of the file.

Note: `exiffile` attempts to adjust for Daylight Saving Time (DST). To do so `exiffile` relies on the underlying settings and services provided by the operating system. Correct Daylight Saving/Summer time conversion relies on these system settings being correct.

7.4.1.3 Supported Image File Types

Table 15 shows the image file types supported by `exiffile`.

Table 15 Image File Type Supported by exiffile

File Type	/n option	/t option
JPEG	✓	✓
EXIF .EXI	✓	✓
TIF	✓	✓
Canon .CR2	✓	✓
Canon .CRW	✓	
EPS	✓	✓
Fujifilm .RAF	✓	✓
Minolta .MRW	✓	✓
Kodak .DCR	✓	✓
Nikon .NEF	✓	✓
EPS	✓	✓

7.4.2 Command Syntax

```
exiffile [/y] [/q] [/r] [/t] [/c x] [/s][/p cmd=charset,exif=charset,iptc=charset]\
            [/n file-name-template|@filename|@-] file...
exiffile [/h|/v|/?]
```

/c x   Sets the character to be used to replace illegal characters (and optionally space characters – see /s option) in file names. If /c is not specified then by default the dash character "-" will be used. This option is ignored if the /n option is not also specified.

/h   Display `exiffile` usage information.

/n [*file-name-template* | *@filename* | *@-*]

Rename the image file to the name specified by *file-name-template*. See Section 6 "Templates" for more information about templates. This option can be specified in one of three ways:
   1) on the command line, for example:

```
/n [date-taken]-[model].jpg
```

   2) as an ampersand followed by the name of a text file containing the *file-name-template*:

```
/n @template.txt
```

   3) an ampersand followed by a '-', indicating that the *field-name-template* is to be read from stdin, for example:

```
/n @-
```

After substitution of field values in to the *file-name-template* is complete, any characters that are invalid in a file name will be replaced with the substitution character (see /c option). If /s has been specified, any spaces in the file name will also be replaced with the substitution character.

```
/p [cmd=xxx],[exif=xxx],[iptc=xxx]
```
             Specify the character sets to be used when interpreting/displaying text fields

                   `cmd=xxx`   sets the charset to be used for output displayed by this command.

                   `exif=xxx`   sets the charset to be used for reading EXIF text fields

                   `iptc=xxx`   sets the charset to be used for reading IPTC text fields

             Any of the three may be omitted. For example:

```
/p exif=latin1,iptc=mac
/p cmd=utf8
```

             These values can also be set using the `EXIFUTILS_CS_CMD`, `EXIFUTILS_CS_EXIF`, `EXIFUTILS_CS_IPTC` environment variables.

             See Section 5 "Character Sets" for more information.

`/q`   Quiet mode. Do not display warning messages.

`/r`   Recursive mode. If any of the files specified is a directory, then image files in the specified directory and all of its subdirectories will be processed.

`/s`   Replace spaces. Any spaces in the file name specified in the `/n` option will be replaced with the substitution character (see `/c` option). This option is ignored if the `/n` option is not also specified.

`/t`   Set last modified timestamp of the image file to match the value in the `date-taken` EXIF field.

`/v`   Display program version and licensing information. This is the default action if no other options are present.

`/y`   Used when invoking this command from a .BAT file that has been created with an ANSI text editor. This option translates the command parameters so that non-English characters are interpretted correctly. If present this option MUST be the first option on the command.

`/?`   Display `exifdate` usage information.

7.4.3 Examples

```
exiffile /t myimage.jpg
```

      Sets the last modified timestamp of the image file `myimage.jpg` to the value of the `date-taken` field.

```
exiffile /t /r .
```

      Sets the last modified timestamp of all image files in the current directory and any subdirectories of the current directory to the value of the `date-taken` field.

```
exiffile /n [date-taken]-[description].jpg myphoto.jpg
```

      Renames `myphoto.jpg` to the name resulting from the substitution of the `date-taken` and `description` EXIF fields. For example, if `date-taken` has a value of "2002:12:31 23:59:59", and the `description` field has a value of "New Years Eve Party", then `myphoto.jpg` will be renamed to:

```
2002-12-31 23-59-59-New Years Eve Party.jpg
```

Note that the colon characters in the date field have been replaced with a dash, as colon characters are not valid in a file name

```
exiffile /c _ /s /n [date-taken]-[description].jpg myphoto.jpg
```

Rename `myphoto.jpg` to the name resulting from the substitution of the `date-taken` and `description` EXIF fields in the *file-name-template*. Any characters that are illegal in a file name will be replaced with an underscore (`/c _` option). Any spaces will also be replaced with an underscore (`/s` option). For example, if `date-taken` has a value of "2002:12:31 23:59:59", and the `description` field has a value of "New Years Eve Party", then `myphoto.jpg` will be renamed to:

```
2002_12_31_23_59_59-New_Years_Eve_Party.jpg
```

7.5 EXIFKEY

7.5.1 Description

The `exifkey` command installs the license key used to enable the full functionality of the EXIFutils. It is also used to display a license that has already been installed.

When you purchase a registered version of EXIFutils you will be provided with a 13-digit license key. This key is generated based on the user name and email address you supplied when you purchased EXIFutils from REG.NET. This key, and the username and email address you supplied, must be installed in the EXIFutils license file on your system in order to use the full EXIFutils functionality.

If no license key is installed, or if the license key installed is invalid, the following restrictions are imposed on the operation of the EXIFutils:
- o no more than 10 image files can be processed in a single invocation of any EXIFutils command,
- o no more than 5 field names can be specified in a field list or field value list,
- o only the first 2 fields in a template will be substituted. Subsequent fields will be replaced with the word "Demo"
- o for repeating IPTC fields, only the first 2 instances of the field will be displayed. Subsequent instances will be replaced with the word "Demo".
- o only the first 50 characters in IPTC field values will be displayed
- o in `exifedit`, the maximum length that a string field value can be set to is 99 characters (if a valid license is installed string values can be up to 999 characters),
- o in `exifedit`, only one action parameter can be specified in a single invocation of the command, i.e. you specify one and only one of the following parameters: `/a, /e, /r, /s,` or `/t.`

To install your license key use `exifkey` as shown:

```
exifkey /k licensekey /u "username" /e emailaddr
```

where
- o *licensekey*   is the license key you received when you purchased your EXIFutils license
- o *username*   is the user name exactly as you entered it when you purchased EXIFutils
- o *emailaddr*   is the email address exactly as you entered it when you purchased EXIFutils

For example, if the username you supplied when you purchased the EXIFutils was `Jane Smith`, the email address was `jane@smith.com`, and the license key you were provide was `1234567890123`, then you would enter the `exifkey` command:

```
exifkey /k 1234567890123 /u "Jane Smith" /e jane@smith.com
```

Note that the user name and email address must be entered EXACTLY as specified when you purchased EXIFutils. If the above command correctly installs the license, then the following command would ***not*** correctly install the license:

```
exifkey /k 1234567890123 /u "jane smith" /e jane@smith.com
```

The above command would not correctly install the license because the user name has been entered as all lower case characters, whereas the first character of each name was upper case when the EXIFutils were purchased.

To display the installed license, use the `/l` option:

```
exifkey /l
```

7.5.2 Command Syntax

```
exifkey /k licensekey /u username /k emailaddr
exifkey [/h|/?|/v|/l]
```

/e *emailaddr*
Email address supplied when the license key was purchased

/h   Display `exifkey` usage information

/k *licensekey*
13 digit EXIFutils license key

/l   List details of the installed license

/u *username*
User name supplied when the license key was purchased

/v   Display program version and licensing information. This is the default action if no other options are present.

/?   Display `exifkey` usage information.

7.5.3 Examples

```
exifkey /l
```

List details of the currently installed license. Sample output is included below:

```
License Key            : 7721245622797
Licensed User          : Jane Citizen
Licensed Email Address  : jane@citizen.com
Licensed Operating System  : Any
Installed EXIFutils Version: 2.x
License Status          : License Valid
```

If this installed license is not valid then a message similar to the following will be displayed:

```
*** License key is not correct for this user or product version. ***
*** Check that all details have been entered correctly.         ***

License Key          : 9999999999999
Licensed User Name    : Jane Citizen
Licensed Email Address: jane@citizen.com
Licensed Version     : 2.x
License Status       : Invalid
```

7.6 EXIFLIST

7.6.1 Description

The primary function of the `exiflist` command is to extract EXIF, IPTC, and RMETA field values from one or more image files, and display them in the format selected via the command parameters. The default action if no command option is specified is to display all fields.

In addition, `exiflist` is used to:
- extract a copy of the thumbnail image from the EXIF data and write it to a separate JPEG file (`/t` option). See Section 7.6.3.
- extract a copy of the audio stream from the EXIF data and write it to a separate .WAV file (`/w` option). See Section 7.6.5.
- Extract an exact copy of all Meta data (EXIF, IPTC, and Flashpix) into a separate .EXI file (`/e` option). See Section 7.6.4.
- list attribute information about the EXIF and IPTC fields that are supported by the EXIFutils, including their format, and the valid values to which they can be set (`/l` option). See Section 7.6.6.
- list the character sets that will be used by exiflist to interpret EXIF and IPTC text fields (`/i` option). See Section 7.6.7.

7.6.1.1 Supported Image File Types

Not all `exiflist` features can be used with all image file types. Table 16 shows the features that are supported for each image file type.

Table 16 File Types for which `exiflist` Options are Supported

File Type	No options (list all fields)	Field List (/o option)	EXIF Block Extraction (/e option)	Thumbnail Extraction (/t option)	Audio File Extraction (/w option)
JPEG	✓	✓	✓	✓	✓
TIF	✓	✓			
EXIF .EXI	✓	✓	✓	✓	
Canon .CR2	✓	✓			
Canon .CRW	✓	✓			
Fujifilm .RAF	✓	✓		✓	
Kodak .DCR	✓	✓			
Minolta .MRW	✓	✓	✓	✓	
Nikon .NEF	✓	✓			
EPS	✓	✓			

7.6.2 Output Format Options

`exiflist` provides four types of display formats, selected by the `/o` option:

Format Type	Command Options	Description

Full field display	`/o a`
	`/o e`
	`/o i`
	`/o r`
		Displays full details of all EXIF fields (`/o e`), all IPTC fields (`/o i`), all RMETA fields (`/o r`) or all fields (`/o a`). See Section 7.6.2.1.

Field list	`/o l`
	`/o lh`
	`/o ln`
	`/o lf`
		Displays selected fields as a comma (or tab) separated list. The fields to be displayed are selected using the `/f` option. See Section 7.6.2.2.

SQL INSERT statement	`/o s`	Displays selected fields as an SQL INSERT statement. The fields to be displayed are selected using the `/f` option. See Section 7.6.2.3.
User specified template	`/o t`	Displays selected fields in the format specified by the user-specified *template*. The output template to be used is specified in the `/s` option. See Section 7.6.2.4.

The default action, if no formatting options are specified, is to display full details of all EXIF and IPTC fields (equivalent to the '`/o a`' option).

7.6.2.1 Full Field Display

The full field display options display all EXIF and/or IPTC fields in an easily read format. It lists each field on its own line, with a full field name and value description. For example:

```
FILE: myphoto.jpg

Camera
  Make                    : EASTMAN KODAK COMPANY
  Model                   : KODAK DC280 ZOOM DIGITAL CAMERA
  Orientation (start point): Upper Left
  X Resolution            : 192
  Y Resolution            : 192
  Resolution Unit         : Inch
  YCbCr Positioning       : Centre
  Copyright               : KODAK DC280 ZOOM DIGITAL CAMERA

Image
  Exposure Time (sec)     : 1/125
  F-Number                : 8.0
  EXIF Version            : 0210
  Date/Time Taken         : 2000:02:03 06:58:43
  Date/Time Digitised     : 2000:02:03 06:58:43
  Components Configuration : 01020300
  Shutter Speed (sec)     : 1/128
  Aperture                : 8.0
  Exposure Bias (EV)      : 0.00
  Max Aperture            : 2.9
  Metering Mode           : Centre Weighted Average
  Light Source            : Auto
  Flash                   : Not Fired
  Focal Length (mm)       : 6.30
  FlashPix Version        : 0100
  Colour Space            : sRGB
```

```
  Image Width                : 1760
  Image Height               : 1168
  Exposure Index             : 100
  Sensing Method             : One chip colour area sensor
  File Source                : Digital Still Camera
  Scene Type                 : Directly Photographed Image

Thumbnail
  Thumb Compression          : JPEG Compression
  Thumb Orientation          : Upper Left
  Thumb X Resolution         : 72
  Thumb Y Resolution         : 72
  Thumb Resolution Unit      : Inch
  Thumb Jpeg IF Offset       : 1488
  Thumb Jpeg IF Byte Count   : 6998

InterOp
  Interop. Index             : R98
  Interop. Version           : 0100

IPTC 2: Editorial
  Version                    : 2
  Date Created               : 2002/11/30
  City                       : Sydney
  State/Province             : NSW
  Country                    : Australia
  Original Xmit Reference    : DCP1234
  Mark as Copyrighted        : No

Ricoh Custom Fields
  Custom Field 1 Name        : Location
  Custom Field 1 Value       : Sydney
  Custom Field 2 Name        : Owner
  Custom Field 2 Value       : J Smith
  Custom Field 3 Name        : Weather
  Custom Field 3 Value       : Sunny
  Custom Field 4 Name        : Reason
  Custom Field 4 Value       : Unknown
  Custom Field 5 Name        : Ready
  Custom Field 5 Value       : No
```

If the `/o a` option is specified, then all EXIF, IPTC, and RMETA fields present in the file will be displayed. This is the default action is no formatting option is specified.

To display only EXIF fields, use the `/o e` option.

To display only IPTC fields, use the `/o i` option.

To display only RMETA fields, use the `/o r` option.

7.6.2.2Field List Display

The field list display formats are intended for use where the output from `exiflist` will be use as input to another program, eg the data is to be imported to a database or spreadsheet. These options display one line for each image file, with the fields separated by either a comma ',' or a tab character. The fields to be displayed are selected using the `/f` option.

The output format to be used is selected using the sub-parameter to the `/o` option:

`/o l`   **Simply Field List:** This is the simplest output format. Field values are displayed as a comma (or tab) separated value list. For example,

```
C:>exiflist /o l /f file-name,make,f-number myphoto.jpg
myphoto.jpg,KODAK,2.8
C:>
```

`/o lh`   **Simple Field List with Headings:** This is similar to the `/o l` option, except that the first line lists the field nicknames of the included fields. For example,

```
C:>exiflist /o lh /f file-name,make,f-number myphoto.jpg
file-name,make,f-number
myphoto.jpg,KODAK,2.8
C:>
```

`/o lf`   **List with Field Descriptions:** Each field value is preceded by its full field description followed by a colon. For example,

```
C:>exiflist /o lf /f file-name,make,f-number myphoto.jpg
File Name : myphoto.jpg,Make : KODAK, F-Number : 2.8
C:>
```

Note that no heading line is displayed.

`/o ln`   **List with Nickname:** Each field value is preceded by its nickname and an equal sign. Each field value is enclosed in quotes ("). For example,

```
C:>exiflist /o ln /f file-name,make,f-number myphoto.jpg
file-name="myphoto.jpg",make="KODAK",f-number="2.8"
C:>
```

As with the '`/o lf`' option no heading line is displayed.

This output format is particularly useful as it is the same format that `exifedit /a` accepts as input. This means that `exiflist` and `exifedit` can be used in combination to transfer fields from one image file to another. For example:

```
C:>exiflist /o ln /f copyright photo.jpg | exifedit /a @- photo2.jpg
```

The above command copies the `copyright` field from `photo.jpg` into `photo2.jpg`.

See the `/k` option for details of changing the quote character that is used.

If any of the fields values contains a new line character, it will be relaced with a semicolon character ";" so that the field output will be on one line. You can use the `/n` option to specifiy an alternative character to replace newline characters.

If multiple instances of a repeating IPTC field (`ip-keyword` or `ip-suppcat`) are being listed, they will be separated by a semicolon. For example, if a file contains three instances of the IPTC keyword field with the values "trains", "planes", and "automobiles", then listing the `ip-keyword` field will have the following result:

```
C:>exiflist /o ln /f ip-keyword photo.jpg
ip-keyword="planes; trains; automobiles"
```

You can change the character used to separate repeating IPTC fields by using the `/j` option.

7.6.2.3 SQL Display

The `/o s` option displays the fields of each image file in an SQL INSERT statement. The fields to be displayed are selected by the `/f` option. For example:

```
C:>exiflist /o s /f file-name,make,f-number myphoto.jpg
INSERT INTO pictures (
    file-name,
    make,
    f-number
) VALUES (
    'myphoto.jpg',
    'EASTMAN KODAK COMPANY',
    8.0
);
C:>
```

7.6.2.4 User Supplied Template Display

The `/o t` option displays the field values in the format described in the user supplied output template. The output template is specified in the `/s` option, which is mandatory when the `/o t` option is present. A template is a character string containing *markers* that indicate where EXIF and IPTC field values are to be substituted. A marker is any valid EXIFutils nickname surrounded by square brackets: []. For example, see the command and sample output below:

```
C:>exiflist /o t /s "File: [file-name]\n  Make : [make]\n  Model: [model]\n\n" \
                                        file1.jpg file2.jpg
File: file1.jpg
  Make : NIKON
  Model: D1X

File: file2.jpg
  Make : KODAK
  Model: DC280

C:>
```

See Section 6 for a detailed explanation of templates.

7.6.3 Thumbnail Image Extraction

Image files can contain an embedded thumbnail image, which can be extracted into a separate JPG file using the `/t` option. The `/t` option accepts as a parameter either a *file-name-template* that describes the name of the file into which the thumbnail is to be written, or a dot '.' indicating that the default file name template is to be used, i.e.

```
/t file-name-template
/t .
```

A *file-name-template* is a string containing markers to indicate where EXIF field values, IPTC field values, and parts of the original file name are to be inserted. See Section 6 for a detailed explanation of templates.

The file name resulting from the *file-name-template* may be a simple file name, or a file name with an absolute or relative directory path. If it is a relative directory path, it will be interpreted as being relative to the directory in which the image file resides, not the current working directory. For example:

```
exiflist  /t thumbs\\[file-name]  mydir\photo.jpg
```

This command will extract the thumbnail image from `mydir\photo.jpg` and store it in a file with the same name as the original image file (`photo.jpg`) in the directory `mydir\thumbs`.

The directory into which the thumbnail file will be written must already exist; `exiflist` will not create it. If the resulting file name exceeds the maximum file name size, the name will be truncated on the right. Any characters that are not valid in file names (\\/:*?\"<>|) will be replaced with a dash "-".

If no template is specified (`/t .`) then the following default template used is:

```
[file-base]-th.jpg
```

This will create the thumbnail file in the same directory as the image file, with a name that has the characters "-th" inserted before the finale dot in the file name. For example:

```
exiflist  /t .  mydir\photo.jpg
```

This command will write the thumbnail image to a file called `photo-th.jpg` in the same directory as the image file (`mydir`).

The `/t` option is not supported for all image file types. See Section 7.6.1.1 for a list of image file types that are supported by this option.

7.6.4 Meta Data Extraction

The `exiflist /e` can be used to extract a complete copy of all EXIF, IPTC, and Flashpix data from an image file into a separate `.exi` file. The .EXI file can be used to store the EXIF information while the image file is being edited, and later copied back into the image file using the `exifcopy` command. The `/e` option accepts as a parameter either a *file-name-template* that describes the name of the file into which the EXIF data is to be written, or a dot '.' indicating that the default template is to be used:

```
/e file-name-template
/e .
```

A *file-name-template* is a string containing markers to indicate where EXIF field values, IPTC field values, and parts of the original file name are to be inserted. See Section 6 for a detailed explanation of templates.

The file name resulting from the *file-name-template* may be a simple file name, or a file name with an absolute or relative directory path. If it is a relative directory path, it will be interpreted as being relative to the directory in which the image file resides, not the current working directory.
For example:

```
    exiflist  /e exifsave\\[file-base].exi  mydir\photo.jpg
```

This command will create an EXI save file with the same name as the original image file, but with the file extension changed to .exi (i.e. photo.exi) in the directory mydir\exifsave.

The directory into which the EXI file will be written must already exist; exiflist will not create it. If the resulting file name exceeds the maximum file name size, the name will be truncated on the right. Any characters that are not valid in file names (\/:*?\"<>|) will be replaced with a dash "-".

If no template is specified (/e .) then the following default template used is:

```
    [file-base].exi
```

This will create the EXIF save file in the same directory as the image file, with the file name extension changed to .exi. For example:

```
    exiflist  /e .  mydir\photo.jpg
```

This command will write the EXIF information to a file called photo.exi in the same directory as the image file (mydir).

The /e option is not supported for all image file types. See Section 7.6.1.1 for a list of image file types that are supported by this option.

7.6.5 Audio Stream Extraction

Image files can contain an embedded Flashpix audio stream, which can be extracted into a separate WAVE format file using the /w option. The /w option accepts as a parameter either a *file-name-template* that describes the name of the file into which the audio stream is to be written, or a dot '.' indicating that the default template is to be used:

```
    /w file-name-template
    /w .
```

A *file-name-template* is a string containing marks to indicate where EXIF field values, IPTC field values, and parts of the original file name are to be inserted. See Section 6 for a detailed explanation of templates.

The file name resulting from the *file-name-template* may be a simple file name, or a file name preceded by an absolute or relative directory path. If it is a relative directory path, it will be interpreted as being relative to the directory in which the image file resides, not the current working directory. For example:

```
    exiflist  /w audio\\[file-base]-audio.wav  mydir\photo.jpg
```

This command will create a .wav audio file with the name photo-audio.wav in the directory mydir\audio

The directory into which the .wav file will be written must already exist; exiflist will not create it. If the resulting file name exceeds the maximum file name size, the name will be truncated on the right. Any characters that are not valid in file names (\/:*?\"<>|) will be replaced with a dash "-".

See Section 6 for a detailed explanation of templates.

If no template is specified (`/w .`) then the default template used is:

```
[file-base].wav
```

This will create the WAVE audio file in the same directory as the image file, with a name that has the ".`jpg`" file extension replaced with ".`wav`". For example:

```
exiflist /w . mydir\photo.jpg
```

This command will write the audio stream to a file called `photo.wav` in the same directory as the image file (`mydir`).

The `/w` option is not supported for all image file types. See Section 7.6.1.1 for a list of image file types that are supported by this option.

7.6.6 Field Attribute List Options

`exiflist` is used to list details of the EXIF and IPTC fields that can be displayed, edited and copied by the EXIFutils. `exiflist` provides three ways of displaying EXIF field information:
1. List nicknames of all fields (`/l n` option). See Section 8 for an example of the output from this command option.
2. List names of all fields and the values to which they can be set (`/l f` option). See the EXIFutils Field Reference Guide for an example of the output from this command option.
3. List details of one or more specific fields (`/l fieldlist` option). The produces output in the same format as the `/l f` option, but lists details of only those fields specified in the `/l` option. See Section 8.1 for an explanation of the output format. eg:

```
exiflist /l description,make,model
```

7.6.7 Character Set List Options

The character sets used by EXIFutils commands to interpret EXIF and IPTC text fields can be set using the `/p` option, and using environment variables. To determine what character sets EXIFutils is used, the `exiflist /i` option is used. The following command will display the character sets that EXIFutils commands will use:

```
exiflist /i
```

This command displays the current character set setting in the following format:

```
Command Character Set: Command Character Set: OEM (Input text files: ACP),
EXIF Character Set   : LATIN1
IPTC Character Set   : LATIN1
```

The `/i` can be used in combination with the `/p` option to verify that the required character sets are being used, for example:

```
exiflist /p exif=utf8 /i

Command Character Set: Command Character Set: OEM (Input text files: ACP),
EXIF Character Set   : UTF8
IPTC Character Set   : LATIN1
```

7.6.8 Command Syntax

```
exiflist [/a] [/q] [/u] [/r] [/x] [/j x]        [/n x] /o [a|e|i] \
                [/p cmd=charset,exif=charset,iptc=charset] file...

exiflist [/a] [/q] [/u] [/r] [/x] [/j x] [/k x] [/n x] /o [l|lh|ln|lf] \
                [/c [c|t]] [/f field-list] \
                [/p cmd=charset,exif=charset,iptc=charset] file...

exiflist [/a] [/q] [/u] [/r] [/x] [/j x] [/k x] [/n x] /o s [/f field-list] \
                [/p cmd=charset,exif=charset,iptc=charset] file...

exiflist [/a] [/q] [/u] [/r] [/x] [/j x] [/k x] [/n x] /o t /s output-template \
                [/p cmd=charset,exif=charset,iptc=charset] file...

exiflist [/y] [/a] [/q] /t [.|file-name-template] \
                [/p cmd=charset,exif=charset,iptc=charset] file...

exiflist [/y] [/a] [/q] /w [.|file-name-template] \
                [/p cmd=charset,exif=charset,iptc=charset] file...

exiflist [/y] [/a] [/q] /e [.|file-name-template] \
                [/p cmd=charset,exif=charset,iptc=charset] file...

exiflist /i [/p cmd=charset,exif=charset,iptc=charset]

exiflist /l [f|n|field-list]
exiflist [/h|/v|/?]
```

/a   Show absolute directory paths. When the directory name is displayed, the full directory path will be shown. By default only the path relative the current directory is shown.

/c [c|t]   Specify the field separator character to be used by the /l option; c = comma, t = tab. By default commas are used.

/e [.|*file-name-template*]
             Extract a copy of all EXIF, IPTC, and Flashpix Meta data from the specified image file(s) and write it to a separate file. The directory into which the file is written, and the name of the file, is specified in the *file-name-template*. For example:

```
/e "[file-base]-save.[file-ext]"
```

             To use the default thumbnail template, specify:

```
/e .
```

             The default *file-name-template* is:

```
[file-base].exi
```

             See Section 7.6.4 "Meta Data Extraction", and Section 6 "Templates" or more information about the use of templates.

`/f [`*`field-name,field-name,...`*` | @`*`file-name`*` | @-]`

Specifies the names of the fields that are to be displayed by the field list (`/o l`, `/o lh`, `/o ln`, `/o lf`) and SQL (`/o s`) options. This parameter can be specified in one of three ways:

1) a comma separated list of field names on the command line, for example:

```
/f file-name,width,height,ip-caption
```

2) an "`@`" followed by the name of a text file containing a list of the field names to be displayed, separated by commas.

```
/f @field-list.txt
```

3) an "`@`" followed by a '–', indicating that the list of the field names is to be read from stdin, for example:

```
/f @-
```

Use the `/l` option to list the valid field names that can be specified in the field list.

If the `/f` option is not specified, the following default set of fields will be displayed:
```
file-name-full
width
height
exp-time
f-number
date-taken
exp-prog
shutter
aperture
exp-bias
meter-mode
flash
```
See also Section 3.1 "Selecting Multiple Fields".

`/h`   Display `exiflist` usage information

`/i`   Display character sets to be used (see `-p` option).

`/j [`*`x`*`|`*`0xnn`*`|`*`0nnn`*`)`

Specify the field separator character to be used to separate repeating IPTC fields. This can be specified in one of three ways:
- As a printable character, for example `/j +`
- As a hexadecimal value, for example `/j 0x10`
- As an octal value with a leading zero, for example `/j 020`

The default value is a semicolon '`;`'

`/k x`   Set the quote character used by the `/o` options to the character 'x'. For example, to set the quote character to be a colon use:

```
/k :
```

`/l [f|n|`*`field-list`*`]`

Displays information about EXIF and IPTC fields. The fields to be displayed, and the level of detail to be displayed about each field, are selected by the sub-parameter. The sub-parameters are:

`/l f`	Display a list of all fields, with details of the valid values to which each field can be set
`/l n`	Display a list of the nicknames of all fields
`/l` *`field-list`*	For the fields specified in *`field-list`*, display details of the valid values to which each field can be set

The `/l` option cannot be use with any other option.

`/n [`*`x`*`|`*`0xnn`*`|`*`0nnn`*`)`

Specify the character to be used to replace any new line characters that appear in field values. This can be specified in one of three ways:

o   As a printable character, for example `/n +`
o   As a hexadecimal value, for example `/n 0x10`
o   As an octal value with a leading zero, for example `/n 020`

The default value is a semicolon '*;*'

`/o [a|e|i|l|lh|lf|ln|s|t]`

Specifies the output format to be used. Available options are:

Full Field Display Options:

`/o a`	Display all EXIF, IPTC, and RMETA fields. This is the default if no formatting options are present
`/o e`	Display only EXIF fields
`/o i`	Display only IPTC fields
`/o r`	Display only RMETA fields

Field List Options:

`/o l`	Display field values in a comma (or tab) separated list
`/o lh`	As for `/o l` but a heading line is displayed containing field nicknames
`/o lf`	Display field values preceded by their full field description
`/o ln`	Display field values preceded by their field nickname. All field values are surrounded by quotes (").

SQL Output Option:

`/o s`	Display fields as an SQL INSERT statement. One INSERT statement is displayed for each file.

User-Specified Template Option:

`/o t`	Display fields in the format supplied by the *`output-template`* in the `/s` option.

The fields to be displayed by the field list and SQL output options are selected using the `/f` option. The field separator character to be used (comma or tab) is selected using the `/c` option. The separator character to be used to separate repeating IPTC fields is selected by the `/j` option.   The quote character to be used is selected by the `/k` option.

`/p [cmd=xxx],[exif=xxx],[iptc=xxx]`

Specify the character sets to be used when interpreting/displaying text fields

`cmd=xxx`	sets the charset to be used for output displayed from this command.
`exif=xxx`	sets the charset to be used for reading/writing EXIF text fields
`iptc=xxx`	sets the charset to be used for reading/writing IPTC text fields

Any of the three may be omitted. For example:

```
/p exif=latin1,iptc=mac
/p cmd=utf8
```

These values can also be set using the `EXIFUTILS_CS_CMD`, `EXIFUTILS_CS_EXIF`, `EXIFUTILS_CS_IPTC` environment variables.

See Section 5 "Character Sets" for more information.

`/q`   Quiet mode. Do not display warning messages

`/r`   Recursive mode. If any of the files specified is a directory, then image files in the specified directory and all of its subdirectories will be processed.

`/s [`*template*`|@`*file-name*`|@-]`
             Specifies the *output-template* to be used by the `/o t` option. This option can be specified in one of three ways:
             1) on the command line, for example:

```
/s "[file-name]\t[date-taken]\t[model]"
```

             2) as an "@" followed by the name of a text file containing the *output-template*:

```
/s @template.txt
```

             3) as an "@" followed by a '-', indicating that the *output-template* is to be read from stdin, for example:

```
/s @-
```

`/t [.|`*file-name-template*`]`
             Extract a copy of the thumbnail image from the specified image file(s) and write them to a separate file. The directory into which the file is written, and the name of the file, is specified in the *file-name-template*. For example:

```
/t "[file-base]-thumb.[file-ext]"
```

             To use the default thumbnail template, specify:

```
/t .
```

             The default `file-name-template` is:

```
[file-base]-th.jpg
```

             See Section 7.6.3 "Thumbnail Image Extraction", and Section 6 for more information about the use of templates.

`/u`   Unformatted mode. `exiflist` will not interpret field values, it will display them as raw values. For example, the shutter speed value 1/125 sec will be displayed uninterpretted as 70/10 in unformatted mode.

`/v`   Display program version and licensing information. This is the default action if no other options are present.

`/w [.|`*file-name-template*`]`

Extract a copy of the Flashpix audio stream from the specified image file(s) and write it to a separate file. The directory into which the file is written, and the name of the file, is specified in the *file-name-template*. For example:

```
/w "[file-base]-audio.WAV"
```

To use the default audio file name template, specify:

```
/w .
```

The default `file-name-template` is:

```
[file-base].wav
```

See Section 7.6.5 "Audio Stream Extraction" and Section 6 "Templates" for more information about the use of templates.

/x   Microsoft Excel compatibility mode. When importing `exiflist` output into Microsoft Excel, Excel does not correctly interpret some EXIF field values (eg: Microsoft Excel™ does not recognise the EXIF date/time format). In Microsoft Excel compatibility mode `exiflist` adjusts the format of certain fields so that Microsoft Excel interprets them correctly. This option is ignored if unformatted mode (`/u`) is also specified.

/y   Used when invoking this command from a .BAT file that has been created with an ANSI text editor. This option translates the command parameters so that non-English characters are interpretted correctly. If present this option MUST be the first option on the command.

/?   Display `exifdate` usage information.

7.6.9 Examples

```
exiflist image1.jpg image2.tif
```

Displays all EXIF, IPTC, and RMETA information from the image files `image1.jpg` and `image2.tif`

```
exiflist /q /r /o l .
```

Displays a summary of EXIF information from all image files in the current directory and all of its subdirectories (`/r` option). Information will be displayed one line per image file (`/o l` option), and warning messages will be suppressed (`/q` option).

```
exiflist /o l /c t ..\pics \usr\users\fred image1.jpg
```

Displays EXIF and IPTC information from all image files in the two specified directories (`..\pics` and `\usr\users\fred`), and for the file `image1.jpg` in the current directory. Information will be displayed one line per file (`/o l` option) with a tab character separating each field (`/c t` option). As the `/f` option is not present, a selection of commonly used EXIF fields will be displayed (see Section 3.1 for more information on the commonly used fields that will be displayed).

```
exiflist /o lh /f file-name,width,height .
```

Displays the file name, image width, and image height, one line per image file, for all image files in the current directory. One line will be printed for each file. A heading line listing the field names will be displayed as the first line (`/o lh` option).

```
exiflist /o lh /f @file-list.txt .
```

For all image files in the current directory, displays the fields specified in the file `file-list.txt`. A heading line listing the field names will be displayed as the first line (`/o lh` option). The contents of `file-list.txt` must be a comma-separated list of field nicknames, for example:

```
description, comment,
date-taken, f-number,shutter
```

New line characters in the file are ignored by `exiflist`.

```
exiflist /o l /f aperture image.jpg
```

Displays the camera aperture setting used when `image.jpg` was taken.

```
exiflist /l n
```

List all of the valid field nicknames that can be specified in field lists. Section 8 contains a complete listing of the output from this command.

```
exiflist /l f
```

List all EXIF and IPTC fields and the valid values to which they can be set. The EXIFutils Field Reference Guide contains a complete listing of the output from this command, and an explanation of the output format.

```
exiflist /l gps*,width,height
```

List the descriptions and valid values for all fields whose nickname begins with "`gps`", and for the `width` and `height` fields.

```
exiflist /o t /s @template.txt mydir
```

Displays fields from all image files in `mydir`, using the output format specified in the output-template read from `template.txt`. A sample `template.txt` is included below:

```
File-name: [file-name]
       Taken on: [date-taken]
       Shutter Speed: [shutter]
       F-Stop: [f-number]
       Compensation: [exp-bias]
```

With this template, the output would be as follows:

```
File-name: myphoto1.jpg
       Taken on: 2003:01:01 07:00:00
       Shutter Speed: 1/125
       F-Stop: 2.8
       Compensation: 0.00
```

```
File-name: photo2.jpg
        Taken on: 2003:01:01 08:14:34
        Shutter Speed: 1/60
        F-Stop: 5.6
        Compensation: -0.5
```

```
exiflist /t "[file-base]-thumb.jpg" image1.jpg
```

Extracts the EXIF thumbnail file from the image file `image1.jpg` and writes it to a file called `image1-thumb.jpg`.

```
exiflist /e . image1.jpg
```

Takes a copy of the Meta data from the file `image1.jpg` and writes it to a file called `image1.exi`.

```
exiflist /o i /p iptc=mac image1.jpg
```

Display all IPTC fields that are present in image1.jpg. All IPTC text fields in the image will be interpreted using the Mac Roman character set.

8 EXIFutils Field Nicknames

8.1 Explanation of Field List Format

The field information in the sections below was generated using the command 'exiflist /l n'. Table 17 explains the information provided for each field.

Table 17 Explanation of Field List Information

Heading	Explanation	
Field Name	The EXIFutils nickname for this field, which can be used to reference this field in EXIFutils commands.	
Attr	Field Attributes. This contains four characters that provide information about the field.	
	1st character	Indicates whether this field is included in the exif-common or iptc group nicknames (Refer to EXIFutils Getting Started Guide). Possible values are: 'E' – this field is included in the exif-common group nickname 'I' – this field is included in the iptc group nickname '–' – this field is not included in either exif-common or iptc
	2nd character	Indicates whether EXIFutils supports reading of this field value. Possible values are: 'R' – this field is readable '–' – this field is not readable
	3rd character	Indicates whether EXIFutils supports writing of this field. "Writing" means that this field can be individually edited by exifedit. Possible values are: 'W' – editing of this field is supported '–' – editing of this field is not supported
	4th character	Indicates whether this field is a "standard" field. Possible values are: 'S' – this field is defined in the relevant standard (see note 1). '–' – this is not a standard field. Either it is a proprietary field defined by a camera maker, or is a field defined by EXIFutils.
Tag	For EXIF and TIFF fields, this is the numeric tag that identifies the field. It is supplied for reference purposes only. For IPTC fields, this value shows the dataset number and field number that together uniquely identify the IPTC field. They are show in the format x.y where 'x' is the dataset number and y is the field number. The dataset number is used to group related IPTC fields together. Many Meta data editing applications only support fields in Dataset 2, the "Editorial" fields. These applications typically do not show the dataset number when referring to the field as it is assumed to be the "Editorial' dataset.	
Description	A brief description of the contents of the field.	

Note 1:
- o   Standard EXIF fields are defined in "JEITA CP-3451, Exchangeable image file format for digital still cameras: Exif Version 2.2".
- o   Standard TIFF fields are defined in" TIFF, Revision 6.0, Final — June 3, 1992".
- o   Standard IPTC fields are defined in " IPTC - NAA Information Interchange Model, Version No. 4, Rev 1, July 1999"

8.2 *File Attribute Fields*

Refer to Section 8.1 for an explanation of the field information shown here.

```
------- Field Name ------ -Attr- -Tag- ----- Description ----------
file-name                  -R--   N/A  File name
file-base                  -R--   N/A  Base file name
file-ext                   -R--   N/A  File name extension
file-name-full             -R--   N/A  File name with path
file-dir                   -R--   N/A  File directory
file-size                  -R--   N/A  File size in bytes
file-date-mod              -R--   N/A  File date modified
file-date-created          -R--   N/A  File date created (Windows only)
file-name-thumb            -R--   N/A  Thumbnail file name
file-name-audio            -R--   N/A  Audio file name
file-name-backup           -R--   N/A  Backup file name
file-name-exi              -R--   N/A  EXIF Save file name
```

8.3 *EXIF Date Taken Component Fields*

```
------- Field Name ------ -Attr- -Tag- ----- Description ----------
yyyy                       -R--   N/A  Date Taken - Year    (4 digits)
yy                         -R--   N/A  Date Taken - Year    (2 digits)
mm                         -R--   N/A  Date Taken - Month   (2 digits)
mmm                        -R--   N/A  Date Taken - Month   (3 letters)
dd                         -R--   N/A  Date Taken - Day     (2 digits)
hr                         -R--   N/A  Date Taken - Hour    (2 digits 24hr)
min                        -R--   N/A  Date Taken - Minute  (2 digits)
sec                        -R--   N/A  Date Taken - Seconds (2 digits)
```

8.4 *Standard EXIF Fields*

Refer to Section 8.1 for an explanation of the field information shown here.

```
------- Field Name ------ -Attr- -Tag- ----- Description ----------
InterOp
  iop-index                ERWS  0001  Interop. Index
  iop-ver                  ERWS  0002  Interop. Version
  iop-form                 ERWS  1000  Related File Format
  iop-width                ERWS  1001  Related Image Width
  iop-length               ERWS  1002  Related Image Length

Camera
  acd-comment              -RW-  000b  ACD Comment
  image-type               -RWS  00fe  Image Type
  main-width               -RWS  0100  Main Image Width
  main-len                 -RWS  0101  Main Image Length
  main-bits-sam            -RWS  0102  Main Image Bits/Sample
  main-comp                -RWS  0103  Main Image Compression
  photo-int                ERWS  0106  PhotometricInterpret.
  doc-name                 ERWS  010d  Document Name
  description              ERWS  010e  Description
  make                     ERWS  010f  Make
  model                    ERWS  0110  Model
  strip-off                -R-S  0111  Strip Offsets
  orient                   ERWS  0112  Orientation (start point)
  sample-pix               ERWS  0115  Sample per Pixel
  row-strip                -R-S  0116  Rows per Strip
```

```
strip-cnt                   -R-S  0117  Strip Byte Count
x-res                       ERWS  011a  X Resolution
y-res                       ERWS  011b  Y Resolution
planar-conf                 ERWS  011c  Planar Configuration
page-name                   ERWS  011d  Page Name
page-x-pos                  ERWS  011e  Page X Position
page-y-pos                  ERWS  011f  Page Y Position
res-unit                    ERWS  0128  Resolution Unit
page-num                    ERWS  0129  Page Number (X of Y)
trans-func                  -RWS  012d  Transfer Function
firm-ver                    ERWS  0131  Firmware Version
date-mod                    ERWS  0132  Date/Time Modified
artist                      -RWS  013b  Artist
white-point                 ERWS  013e  White Point
prim-chrom                  ERWS  013f  Primary Chromatic
sub-ifd                     ERWS  014a  Sub-IFD
ycbcr-coeff                 ERWS  0211  YCbCr Coefficients
ycbcr-posn                  ERWS  0213  YCbCr Positioning
ref-bw                      ERWS  0214  Reference Black&White
xp-title-text               ERWS  0320  XP Title Text
camera-num                  ERWS  827d  Camera Number
copyright                   ERWS  8298  Copyright
comment-old                 -RW-  9286  User Comment (EXIF 2.0)
xp-rating                   -RW-  4746  XP Rating (1-5,0=Unrated)
xp-dip-tags                 -RW-  4747  Digital Image Pro Tags
xp-title                    -RW-  9c9b  XP Title
xp-comment                  -RW-  9c9c  XP Comment
xp-author                   -RW-  9c9d  XP Author
xp-keyword                  -RW-  9c9e  XP Keywords
xp-subject                  -RW-  9c9f  XP Subject
print-im                    -RWS  c4a5  Print Image Matching

Image
  exp-time                  ERWS  829a  Exposure Time (sec)
  f-number                  ERWS  829d  F-Number
  exp-prog                  ERWS  8822  Exposure Program
  spec-sens                 ERWS  8824  Spectral Sensitivity
  iso-speed                 ERWS  8827  ISO Speed
  oecf                      ERWS  8828  Optoelectric Conv. Factor
  exif-ver                  ERWS  9000  EXIF Version
  date-taken                ERWS  9003  Date/Time Taken
  date-digi                 ERWS  9004  Date/Time Digitised
  comp-conf                 -RWS  9101  Components Configuration
  ave-comp                  ERWS  9102  Average Compression Ratio
  shutter                   ERWS  9201  Shutter Speed (sec)
  aperture                  ERWS  9202  Aperture
  brightness                ERWS  9203  Brightness
  exp-bias                  ERWS  9204  Exposure Bias (EV)
  max-aper                  ERWS  9205  Max Aperture
  subj-dist                 ERWS  9206  Subject Distance (metres)
  meter-mode                ERWS  9207  Metering Mode
  light-src                 ERWS  9208  Light Source
  flash                     ERWS  9209  Flash
  focal-len                 ERWS  920a  Focal Length (mm)
  history                   ERWS  9213  Image History
  subj-area                 ERWS  9214  Subject Area
  maker-note                -R-S  927c  Maker Note
```

```
comment                    ERWS   9286   User Comment
sub-time                   ERWS   9290   Subsec Time
sub-time-orig              ERWS   9291   Subsec Time Original
sub-time-digi              ERWS   9292   Subsec Time Digitised
flashpix-ver               -RWS   a000   FlashPix Version
colour-space               ERWS   a001   Colour Space
width                      ERWS   a002   Image Width
height                     ERWS   a003   Image Height
sound-file                 ERWS   a004   Related Sound File
inter-offset               -R-S   a005   EXIF Inter. Offset
sfr                        -RWS   a20c   Spatial Freq. Response
flash-energy               ERWS   a20b   Flash Energy (BCPS)
fp-x-res                   ERWS   a20e   Focal Plane X Resolution
fp-y-res                   ERWS   a20f   Focal Plane Y Resolution
fp-res-unit                ERWS   a210   Focal Plane Res. Unit
subj-locn                  ERWS   a214   Subject Location
exp-index                  ERWS   a215   Exposure Index
sense-method               ERWS   a217   Sensing Method
file-src                   ERWS   a300   File Source
scene-type                 ERWS   a301   Scene Type
cfa-pattern                -RWS   a302   CFA Pattern
custom-render              ERWS   a401   Custom Render
exp-mode                   ERWS   a402   Exposure Mode
white-bal                  ERWS   a403   White Balance
digital-zoom               ERWS   a404   Digital Zoom Ratio
focal-len-35mm             ERWS   a405   Focal Length (35mm equiv)
scene-mode                 ERWS   a406   Scene Capture Mode
gain                       ERWS   a407   Gain Control
contrast                   ERWS   a408   Contrast
saturation                 ERWS   a409   Saturation
sharpness                  ERWS   a40a   Sharpness
dev-setting                -RWS   a40b   Device Setting
subj-range                 ERWS   a40c   Subject Distance Range
image-id                   ERWS   a420   Unique Image Id

Thumbnail
  th-width                 ERWS   0100   Thumb Image Width
  th-len                   ERWS   0101   Thumb Image Length
  th-bits-sam              -RWS   0102   Thumb Bits per Sample
  th-comp                  ERWS   0103   Thumb Compression
  th-photo-int             ERWS   0106   Thumb PhotometricInterp.
  th-description           ERWS   010e   Thumb Description
  th-make                  ERWS   010f   Thumb Make
  th-model                 ERWS   0110   Thumb Model
  th-strip-off             -R-S   0111   Thumb Strip Offsets
  th-orient                ERWS   0112   Thumb Orientation
  th-sample-pix            ERWS   0115   Thumb Sample per Pixel
  th-row-strip             ER-S   0116   Thumb Rows per Strip
  th-strip-cnt             ER-S   0117   Thumb Strip Byte Count(s)
  th-x-res                 ERWS   011a   Thumb X Resolution
  th-y-res                 ERWS   011b   Thumb Y Resolution
  th-plan-conf             ERWS   011c   Thumb Planar Config
  th-res-unit              ERWS   0128   Thumb Resolution Unit
  th-firm-ver              ERWS   0131   Thumb Firmware Version
  th-date-mod              ERWS   0132   Thumb Date/Time Modified
  th-artist                -RWS   013b   Thumb Artist
  th-white-point           ERWS   013e   Thumb White Point
```

```
    th-prim-chrom                 ERWS   013f   Thumb Primary Chromatic
    th-if-offset                  ERWS   0201   Thumb Jpeg IF Offset
    th-if-count                   ERWS   0202   Thumb Jpeg IF Byte Count
    th-ycbcr-coeff                ERWS   0211   Thumb YCbCr Coefficients
    th-ycbcr-sub                  ERWS   0212   Thumb YCbCr Sub-Sampling
    th-ycbcr-posn                 ERWS   0213   Thumb YCbCr Positioning
    th-ref-bw                     ERWS   0214   Thumb Reference Black/White
    th-copyright                  ERWS   8298   Thumb Copyright

GPS
    gps-ver                       -RWS   0000   Version
    gps-lat-ref                   -RWS   0001   Latitude Reference
    gps-latitude                  -RWS   0002   Latitude
    gps-long-ref                  -RWS   0003   Longitude Reference
    gps-longitude                 -RWS   0004   Longitude
    gps-alt-ref                   -RWS   0005   Altitude Reference
    gps-altitude                  -RWS   0006   Altitude
    gps-time                      -RWS   0007   Time
    gps-satellite                 -RWS   0008   Satellite
    gps-recv-stat                 -RWS   0009   Receive Status
    gps-mode                      -RWS   000a   Measurement Mode
    gps-precision                 -RWS   000b   Measurement Precision
    gps-speed-unit                -RWS   000c   Speed Unit
    gps-recv-speed                -RWS   000d   Receiver Speed
    gps-mov-dir-ref               -RWS   000e   Movement Direction Ref
    gps-mov-dir                   -RWS   000f   Movement Direction
    gps-img-dir-ref               -RWS   0010   Image Direction Ref
    gps-img-dir                   -RWS   0011   Image Direction
    gps-geodetic                  -RWS   0012   Geodetic Survey Data
    gps-dest-lat-ref              -RWS   0013   Dest. Latitude Ref
    gps-dest-lat                  -RWS   0014   Destination Latitude
    gps-dest-long-ref             -RWS   0015   Dest. Longitude Ref
    gps-dest-long                 -RWS   0016   Destination Longitude
    gps-dest-bear-ref             -RWS   0017   Dest. Bearing Ref
    gps-dest-bear                 -RWS   0018   Destination Bearing
    gps-dest-dist-ref             -RWS   0019   Dest. Distance Ref
    gps-dest-dist                 -RWS   001a   Destination Distance
    gps-proc-method               -RWS   001b   Processing Method
    gps-area                      -RWS   001c   Area Information
    gps-date                      -RWS   001d   Datestamp
    gps-diff-corr                 -RWS   001e   Differential Correction
```

8.5 TIFF Fields

Refer to Section 8.1 for an explanation of the field information shown here.

```
    ------- Field Name ------ -Attr- -Tag- ----- Description ----------
    tf-image-type                 -RWS   00fe   TIFF Image Type
    tf-width                      ERWS   0100   TIFF Image Width
    tf-len                        ERWS   0101   TIFF Image Length
    tf-bits-sam                   -RWS   0102   TIFF Image Bits/Sample
    tf-comp                       ERWS   0103   TIFF Image Compression
    tf-photo-int                  ERWS   0106   TIFF PhotometricInterp.
    tf-description                ERWS   010e   TIFF Description
    tf-make                       ERWS   010f   TIFF Make
    tf-model                      ERWS   0110   TIFF Model
```

```
tf-strip-off            -R-S  0111  TIFF Strip Offsets
tf-orient               ERWS  0112  TIFF Orientation
tf-sample-pix           ER-S  0115  TIFF Sample per Pixel
tf-row-strip            ER-S  0116  TIFF Rows per Strip
tf-strip-cnt            ER-S  0117  TIFF Strip Byte Count(s)
tf-x-res                ERWS  011a  TIFF X Resolution
tf-y-res                ERWS  011b  TIFF Y Resolution
tf-plan-conf            ERWS  011c  TIFF Planar Config
tf-res-unit             ERWS  0128  TIFF Resolution Unit
tf-firm-ver             ERWS  0131  TIFF Firmware Version
tf-date-mod             ERWS  0132  TIFF Date/Time Modified
tf-artist               -RWS  013b  TIFF Artist
tf-white-point          ERWS  013e  TIFF White Point
tf-prim-chrom           ERWS  013f  TIFF Primary Chromatic
tf-if-offset            ERWS  0201  TIFF Jpeg IF Offset
tf-if-count             ERWS  0202  TIFF Jpeg IF Byte Count
tf-ycbcr-coeff          ERWS  0211  TIFF YCbCr Coefficients
tf-ycbcr-sub            ERWS  0212  TIFF YCbCr Sub-Sampling
tf-ycbcr-posn           ERWS  0213  TIFF YCbCr Positioning
tf-ref-bw               ERWS  0214  TIFF Reference Black/White
tf-copyright            ERWS  8298  TIFF Copyright
```

8.6 Proprietary Make Note Fields

Refer to Section 8.1 for an explanation of the field information shown here.

```
------- Field Name ------ -Attr- -Tag- ----- Description ----------
Maker Note (Canon PowerShot)
  cn-0000               -RW-  0000  Field 0x0000
  cn-macro-mode         -R--  0001  Macro Mode
  cn-self-timer         -R--  0001  Self Timer
  cn-quality            -R--  0001  Quality
  cn-flash-mode         -R--  0001  Flash Mode
  cn-drive-mode         -R--  0001  Drive Mode
  cn-focus-mode         -R--  0001  Focus Mode
  cn-image-size         -R--  0001  Image Size
  cn-easy-shoot         -R--  0001  Easy Shoot
  cn-digi-zoom          -R--  0001  Digital Zoom
  cn-contrast           -R--  0001  Contrast
  cn-saturation         -R--  0001  Saturation
  cn-sharpness          -R--  0001  Sharpness
  cn-iso                -R--  0001  ISO
  cn-meter-mode         -R--  0001  Meter Mode
  cn-focus-type         -R--  0001  Focus Type
  cn-af-point           -R--  0001  AF Point
  cn-exp-mode           -R--  0001  Exposure Moded
  cn-focal-len-long     -R--  0001  Focal Length Long
  cn-focal-len-short    -R--  0001  Focal Length Short
  cn-focal-units        -R--  0001  Focal Units per mm
  cn-flash-activity     -R--  0001  Flash Activity
  cn-flash              -R--  0001  Flash
  cn-focus              -R--  0001  Focus
  cn-0002               -RW-  0002  Field 0x0002
  cn-0003               -RW-  0003  Field 0x0003
  cn-white-bal          -R--  0004  White Balance
  cn-burst-seq          -R--  0004  Continuous Burst Seq
  cn-af-point2          -R--  0004  AF Point (2)
```

```
    cn-flash-bias            -R--   0004   Flash Bias (EV)
    cn-subj-dist             -R--   0004   Subject Distance
    cn-0005                  -RW-   0005   Field 0x0005
    cn-image-type            -RW-   0006   Image Type
    cn-firm-ver              -RW-   0007   Firmware Version
    cn-image-num             -RW-   0008   Image Number
    cn-owner                 -RW-   0009   Owner Name
    cn-000a                  -RW-   000a   Field 0x000a
    cn-body-num              -RW-   000c   Camera Body Number
    cn-000d                  -RW-   000d   Field 0x000d
    cn-000e                  -RW-   000e   Field 0x000e
    cn-noise-reduct          -RW-   000f   Long Exp. Noise Reduct
    cn-ae-lock               -RW-   000f   AE Lock Button
    cn-mirror-lockup         -RW-   000f   Mirror Lockup
    cn-tv-av-exp             -RW-   000f   Tv/Av and Exposure Level
    cn-av-assist             -RW-   000f   Av Assist Light
    cn-shutter-in-av         -RW-   000f   Shutter in Av Mode
    cn-aeb-seq               -RW-   000f   AEB Seq/Auto Cancellation
    cn-shutter-curtain       -RW-   000f   Shutter Curtain Sync
    cn-lens-func             -RW-   000f   Lens AF Stop Button Func.
    cn-fill-flash            -RW-   000f   Auto Reduction Fill Flash
    cn-menu-return           -RW-   000f   MENU Button Return Posn
    cn-set-button            -RW-   000f   SET Button Function
    cn-sensor-cleaning       -RW-   000f   Sensor Cleaning
    cn-0010                  -RW-   0010   Field 0x0010
    cn-0012                  -RW-   0012   Field 0x0012
    cn-0013                  -RW-   0013   Field 0x0013
    cn-0015                  -RW-   0015   Field 0x0015
    cn-0081                  -RW-   0081   Field 0x0081
    cn-0082                  -RW-   0082   Field 0x0082
    cn-0083                  -RW-   0083   Field 0x0083
    cn-0090                  -RW-   0090   Field 0x0090
    cn-0091                  -RW-   0091   Field 0x0091
    cn-0092                  -RW-   0092   Field 0x0092
    cn-0094                  -RW-   0094   Field 0x0094

Maker Note (Casio)
    cs-rec-mode              -RW-   0001   Recording Mode
    cs-quality               -RW-   0002   Quality
    cs-focus-mode            -RW-   0003   Focusing Mode
    cs-flash-mode            -RW-   0004   Flash Mode
    cs-flash-int             -RW-   0005   Flash Intensity
    cs-obj-dist              -RW-   0006   Object Distance
    cs-white-bal             -RW-   0007   White Balance
    cs-0008                  -RW-   0008   Field 0x0008
    cs-0009                  -RW-   0009   Field 0x0009
    cs-digi-zoom             -RW-   000a   Digital Zoom
    cs-sharpness             -RW-   000b   Sharpness
    cs-contrast              -RW-   000c   Contrast
    cs-saturation            -RW-   000d   Saturation
    cs-000e                  -RW-   000e   Field 0x000e
    cs-000f                  -RW-   000f   Field 0x000f
    cs-0010                  -RW-   0010   Field 0x0010
    cs-0011                  -RW-   0011   Field 0x0011
    cs-0012                  -RW-   0012   Field 0x0012
    cs-0013                  -RW-   0013   Field 0x0013
    cs-ccd                   -RW-   0014   CCD Sensitivity
```

```
   cs-0015                    -RW-   0015   Field 0x0015
   cs-0016                    -RW-   0016   Field 0x0016
   cs-0017                    -RW-   0017   Field 0x0017
   cs-0018                    -RW-   0018   Field 0x0018
   cs-0019                    -RW-   0019   Field 0x0019
   cs-001a                    -RW-   001a   Field 0x001a
   cs-001c                    -RW-   001c   Field 0x001c
   cs-001d                    -RW-   001d   Field 0x001d
   cs-0e00                    -RW-   0e00   Field 0x0e00

Maker Note (Epson)
   eps-0209                   -RW-   0209   Field 0x0209
   eps-0f00                   -RW-   0f00   Field 0x0f00

Maker Note (FujiFilm)
   fu-version                 -RW-   0000   Version
   fu-quality                 -RW-   1000   Quality
   fu-sharpness               -RW-   1001   Sharpness
   fu-white-bal               -RW-   1002   White Balance
   fu-1003                    -RW-   1003   Field 0x1003
   fu-flash-mode              -RW-   1010   Flash Mode
   fu-flash-str               -RW-   1011   Flash Strength Comp
   fu-macro                   -RW-   1020   Macro
   fu-focus-mode              -RW-   1021   Focus Mode
   fu-1022                    -RW-   1022   Field 0x1022
   fu-1023                    -RW-   1023   Field 0x1023
   fu-slow-sync               -RW-   1030   Slow Sync.
   fu-picture-mode            -RW-   1031   Picture Mode
   fu-bracket                 -RW-   1100   Contin/Bracket Mode
   fu-1200                    -RW-   1200   Field 0x1200
   fu-blur-warn               -RW-   1300   Blur Warning
   fu-focus-warn              -RW-   1301   Focus Warning
   fu-ae-warn                 -RW-   1302   AE Warning

Maker Note (Minolta)
   mn-version                 -RW-   0000   Version
   mns1-exp-mode              -R--   0001   Exposure Mode
   mns1-flash-mode            -R--   0001   Flash Mode
   mns1-white-bal             -R--   0001   White Balance
   mns1-image-dim             -R--   0001   Image Dimensions
   mns1-image-qual            -R--   0001   Image Quality
   mns1-drive-mode            -R--   0001   Drive Mode
   mns1-meter-mode            -R--   0001   Meter Mode
   mns1-apex-film-speed       -R--   0001   APEX Film Speed Value
   mns1-apex-time             -R--   0001   APEX Time Value
   mns1-apex-aperture         -R--   0001   APEX Aperture Value
   mns1-macro-mode            -R--   0001   Macro Mode
   mns1-digital-zoom          -R--   0001   Digital Zoom
   mns1-exp-comp              -R--   0001   Exposure Compensation
   mns1-bracket-step          -R--   0001   Bracket Step (EV)
   mns1-0003-10               -R--   0001   Field 0x0003-10
   mns1-interval-len          -R--   0001   Interval Length (min)
   mns1-interval-num          -R--   0001   Num Interval Frames
   mns1-focal-len             -R--   0001   Focal Length
   mns1-focus-dist            -R--   0001   Focus Distance (meters)
   mns1-flashFired            -R--   0001   Flash Fired
   mns1-date                  -R--   0001   Date
```

```
mns1-time                   -R--   0001   Time
mns1-max-aper               -R--   0001   Maximum Aperture
mns1-0003-19                -R--   0001   Field 0x0003-19
mns1-0003-1a                -R--   0001   Field 0x0003-1a
mns1-file-num-mem           -R--   0001   File Number Memory
mns1-last-file-num          -R--   0001   Last File Number
mns1-white-bal-red          -R--   0001   White Balance Red
mns1-white-bal-green        -R--   0001   White Balance Green
mns1-white-bal-blue         -R--   0001   White Balance Blue
mns1-saturation             -R--   0001   Saturation
mns1-Contrast               -R--   0001   Contrast
mns1-sharpness              -R--   0001   Sharpness
mns1-subj-prog              -R--   0001   Subject Program
mns1-flash-comp             -R--   0001   Flash Compensation
mns1-iso-setting            -R--   0001   ISO Setting
mns1-model                  -R--   0001   Camera Model
mns1-interval-mode          -R--   0001   Interval Mode
mns1-folder-setting         -R--   0001   Folder Name Setting
mns1-color-mode             -R--   0001   Color Mode
mns1-color-filter           -R--   0001   Color Filter
mns1-bw-filter              -R--   0001   Black and White Filter
mns1-internal-flash         -R--   0001   Internal Flash Fired
mns1-apex-bright            -R--   0001   APEX Brightness Value
mns1-spot-focus-x           -R--   0001   Spot Focus X Position
mns1-spot-focus-y           -R--   0001   Spot Focus Y Position
mns1-wide-focus-zone        -R--   0001   AF Wide Focus Zone
mns1-focus-mode             -R--   0001   Focus Mode
mns1-focus-area             -R--   0001   AF Focus Area
mns1-dec-setting            -R--   0001   DEC Setting
mns1-embedded-profile       -R--   0001   Embedded Color Profile
mns1-data-imprint           -R--   0001   Data Imprint
mns1-0003-36                -R--   0001   Field 0x0003-36
mns1-0003-37                -R--   0001   Field 0x0003-37
mns1-0003-38                -R--   0001   Field 0x0003-38
mns1-0003-39                -R--   0001   Field 0x0003-39
mns2-0003-1                 -R--   0003   Field 0x0003-1
mns2-exp-mode               -R--   0003   Exposure Mode
mns2-flash-mode             -R--   0003   Flash Mode
mns2-white-bal              -R--   0003   White Balance
mns2-image-dim              -R--   0003   Image Dimensions
mns2-image-qual             -R--   0003   Image Quality
mns2-drive-mode             -R--   0003   Drive Mode
mns2-meter-mode             -R--   0003   Meter Mode
mns2-apex-film-speed        -R--   0003   APEX Film Speed Value
mns2-apex-time              -R--   0003   APEX Time Value
mns2-apex-aperture          -R--   0003   APEX Aperture Value
mns2-macro-mode             -R--   0003   Macro Mode
mns2-digital-zoom           -R--   0003   Digital Zoom
mns2-exp-comp               -R--   0003   Exposure Compensation
mns2-bracket-step           -R--   0003   Bracket Step (EV)
mns2-0003-10                -R--   0003   Field 0x0003-10
mns2-interval-len           -R--   0003   Interval Length (min)
mns2-interval-num           -R--   0003   Num Interval Frames
mns2-focal-len              -R--   0003   Focal Length
mns2-focus-dist             -R--   0003   Focus Distance (meters)
mns2-flashFired             -R--   0003   Flash Fired
mns2-date                   -R--   0003   Date
```

```
    mns2-time                  -R--   0003   Time
    mns2-max-aper              -R--   0003   Maximum Aperture
    mns2-0003-19              -R--   0003   Field 0x0003-19
    mns2-0003-1a              -R--   0003   Field 0x0003-1a
    mns2-file-num-mem          -R--   0003   File Number Memory
    mns2-last-file-num         -R--   0003   Last File Number
    mns2-white-bal-red         -R--   0003   White Balance Red
    mns2-white-bal-green       -R--   0003   White Balance Green
    mns2-white-bal-blue        -R--   0003   White Balance Blue
    mns2-saturation            -R--   0003   Saturation
    mns2-Contrast              -R--   0003   Contrast
    mns2-sharpness             -R--   0003   Sharpness
    mns2-subj-prog             -R--   0003   Subject Program
    mns2-flash-comp            -R--   0003   Flash Compensation
    mns2-iso-setting           -R--   0003   ISO Setting
    mns2-model                 -R--   0003   Camera Model
    mns2-interval-mode         -R--   0003   Interval Mode
    mns2-folder-setting        -R--   0003   Folder Name Setting
    mns2-color-mode            -R--   0003   Color Mode
    mns2-color-filter          -R--   0003   Color Filter
    mns2-bw-filter             -R--   0003   Black and White Filter
    mns2-internal-flash        -R--   0003   Internal Flash Fired
    mns2-apex-bright           -R--   0003   APEX Brightness Value
    mns2-spot-focus-x          -R--   0003   Spot Focus X Position
    mns2-spot-focus-y          -R--   0003   Spot Focus Y Position
    mns2-wide-focus-zone       -R--   0003   AF Wide Focus Zone
    mns2-focus-mode            -R--   0003   Focus Mode
    mns2-focus-area            -R--   0003   AF Focus Area
    mns2-dec-setting           -R--   0003   DEC Setting
    mns2-embedded-profile      -R--   0003   Embedded Color Profile
    mns2-data-imprint          -R--   0003   Data Imprint
    mns2-0003-36              -R--   0003   Field 0x0003-36
    mns2-0003-37              -R--   0003   Field 0x0003-37
    mns2-0003-38              -R--   0003   Field 0x0003-38
    mns2-0003-39              -R--   0003   Field 0x0003-39
    mn-0010                    -RW-   0010   Field 0x0010
    mn-0018                    -RW-   0018   Field 0x0018
    mn-0020                    -RW-   0020   Field 0x0020
    mn-image-size              -RW-   0040   Compressed Image Size
    mn-thumbnail               -RW-   0081   Thumbnail Image
    mn-thumb-offset            -RW-   0088   Thumbnail Offset
    mn-thumb-len               -RW-   0089   Thumbnail Length
    mn-00e0                    -RW-   00e0   Field 0x00e0
    mn-0100                    -RW-   0100   Field 0x0100
    mn-color-mode              -RW-   0101   Color Mode
    mn-quality                 -RW-   0102   Image Quality
    mn-quality2                -RW-   0103   Image Quality 2
    mn-0006                    -RW-   0106   Field 0x0106
    mn-0211                    -RW-   0211   Field 0x0211
    mn-0212                    -RW-   0212   Field 0x0212
    mn-0213                    -RW-   0213   Field 0x0213
    mn-0214                    -RW-   0214   Field 0x0214
    mn-pim                     -RW-   0e00   PIM Information
    mn-settings3               -RW-   0f00   Camera Settings 3

Maker Note (Nikon Type 1)
    n1-0002                    -RW-   0002   Field 0x0002
```

```
   n1-quality                  -RW-   0003   Quality
   n1-col-mode                 -RW-   0004   Colour Mode
   n1-image-adj                -RW-   0005   Image Adjustment
   n1-ccd-sens                 -RW-   0006   CCD Sensitivity
   n1-white-bal                -RW-   0007   White Balance
   n1-focus                    -RW-   0008   Focus
   n1-0020                     -RW-   0009   Field 0x0020
   n1-digi-zoom                -RW-   000a   Digital Zoom
   n1-converter                -RW-   000b   Lens Converter
   n1-0f00                     -RW-   0f00   Field 0x0f00

Maker Note (Nikon Type 2)
   n2-version                  -RW-   0001   Version
   n2-iso                      -RW-   0002   ISO Setting
   n2-color-mode               -RW-   0003   Colour Mode
   n2-quality                  -RW-   0004   Quality
   n2-white-bal                -RW-   0005   White Balance
   n2-sharpen                  -RW-   0006   Image Sharpening
   n2-focus-mode               -RW-   0007   Focus Mode
   n2-flash-set                -RW-   0008   Flash Setting
   n2-000a                     -RW-   000a   Field 0x000a
   n2-iso-sel                  -RW-   000f   ISO Selection
   n2-data-dump                -RW-   0010   Data Dump
   n2-image-adj                -RW-   0080   Image Adjustment
   n2-adapter                  -RW-   0082   Lens Adapter
   n2-man-focus                -RW-   0085   Manual Focus Distance
   n2-digi-zoom                -RW-   0086   Digital Zoom
   n2-focus-posn               -RW-   0088   AF Focus Position
   n2-saturation               -RW-   0094   Saturation Adjustment
   n2-noise                    -RW-   0095   Noise Reduction

Maker Note (Nikon Type 3)
   n3-version                  -RW-   0001   Version
   n3-iso                      -RW-   0002   ISO Setting
   n3-color-mode               -RW-   0003   Colour Mode
   n3-quality                  -RW-   0004   Quality
   n3-white-bal                -RW-   0005   White Balance
   n3-sharp                    -RW-   0006   Sharpening
   n3-focus                    -RW-   0007   Focus
   n3-flash-set                -RW-   0008   Flash Setting
   n3-flash-mode               -RW-   0009   Flash Mode
   n3-000a                     -RW-   000a   Field 0x000a
   n3-white-bias               -RW-   000b   White Balance Bias
   n3-000c                     -RW-   000c   Field 0x000c
   n3-000d                     -RW-   000d   Field 0x000d
   n3-exp-diff                 -RW-   000e   Exposure Difference
   n3-iso-sel                  -RW-   000f   ISO Selection
   n3-0010                     -RW-   0010   Field 0x0010
   n3-thumb-offset             -R--   0011   Thumbnail IFD Offset
   n3-flash-comp               -RW-   0012   Flash Compensation
   n3-0013                     -RW-   0013   Field 0x0013
   n3-0017                     -RW-   0017   Field 0x0017
   n3-0018                     -RW-   0018   Field 0x0018
   n3-0019                     -RW-   0019   Field 0x0019
   n3-image-adj                -RW-   0080   Image Adjustment
   n3-tone-comp                -RW-   0081   Tone Compensation
   n3-lens-type                -RW-   0083   Lens Type
```

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    n3-lens                     -RW-   0084   Lens
    n3-man-focus                -RW-   0085   Manual Focus Distance
    n3-digi-zoom                -RW-   0086   Digital Zoom
    n3-flash-used               -RW-   0087   Flash Used
    n3-focus-posn               -RW-   0088   AF Focus Position
    n3-bracket                  -RW-   0089   Bracketing
    n3-008a                     -RW-   008a   Field 0x008a
    n3-008b                     -RW-   008b   Field 0x008b
    n3-color-mode2              -RW-   008d   Color Mode
    n3-008e                     -RW-   008e   Field 0x008e
    n3-light-type               -RW-   0090   Lighting Type
    n3-0091                     -RW-   0091   Field 0x0091
    n3-hue-adj                  -RW-   0092   Hue Adjustment
    n3-saturation               -RW-   0094   Saturation Adjustment
    n3-noise                    -RW-   0095   Noise Reduction
    n3-0091                     -RW-   0097   Field 0x0091
    n3-0098                     -RW-   0098   Field 0x0098
    n3-009a                     -RW-   009a   Field 0x009a
    n3-0103                     -RW-   0103   Field 0x0103
    n3-0e10                     -RW-   0e10   Field 0x0e10

Maker Note (Olympus)
    ol-spec-mode                -RW-   0200   Special Mode
    ol-jpg-qual                 -RW-   0201   JPEG Quality
    ol-macro                    -RW-   0202   Macro
    ol-0203                     -RW-   0203   Field 0x0203
    ol-digi-zoom                -RW-   0204   Digital Zoom
    ol-0205                     -RW-   0205   Field 0x0205
    ol-0206                     -RW-   0206   Field 0x0206
    ol-sw-rel                   -RW-   0207   Software Release
    ol-pic-info                 -RW-   0208   Picture Information
    ol-camera-id                -RW-   0209   Camera Id
    ol-data-dump                -RW-   0f00   Data Dump

Maker Note (Olympus C2500L)
    olc2500l-spec-mode          -RW-   0200   Special Mode
    olc2500l-jpg-qual           -RW-   0201   JPEG Quality
    olc2500l-macro              -RW-   0202   Macro
    olc2500l-0203               -RW-   0203   Field 0x0203
    olc2500l-digi-zoom          -RW-   0204   Digital Zoom
    olc2500l-0205               -RW-   0205   Field 0x0205
    olc2500l-0206               -RW-   0206   Field 0x0206
    olc2500l-sw-rel             -RW-   0207   Software Release
    olc2500l-pic-info           -RW-   0208   Picture Information
    olc2500l-camera-id          -RW-   0209   Camera Id
    olc2500l-data-dump          -RW-   0f00   Data Dump
    olc2500l-1000               -RW-   1000   Field 0x1000
    olc2500l-1001               -RW-   1001   Field 0x1001
    olc2500l-1002               -RW-   1002   Field 0x1002
    olc2500l-1003               -RW-   1003   Field 0x1003
    olc2500l-1004               -RW-   1004   Field 0x1004
    olc2500l-1005               -RW-   1005   Field 0x1005
    olc2500l-1006               -RW-   1006   Field 0x1006
    olc2500l-1007               -RW-   1007   Field 0x1007
    olc2500l-1008               -RW-   1008   Field 0x1008
    olc2500l-1009               -RW-   1009   Field 0x1009
    olc2500l-100a               -RW-   100a   Field 0x100a
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olc2500l-100b              -RW-  100b  Field 0x100b
olc2500l-100c              -RW-  100c  Field 0x100c
olc2500l-100d              -RW-  100d  Field 0x100d
olc2500l-100e              -RW-  100e  Field 0x100e
olc2500l-100f              -RW-  100f  Field 0x100f
olc2500l-1010              -RW-  1010  Field 0x1010
olc2500l-1011              -RW-  1011  Field 0x1011
olc2500l-1012              -RW-  1012  Field 0x1012
olc2500l-1013              -RW-  1013  Field 0x1013
olc2500l-1014              -RW-  1014  Field 0x1014
olc2500l-1015              -RW-  1015  Field 0x1015
olc2500l-1016              -RW-  1016  Field 0x1016
olc2500l-1017              -RW-  1017  Field 0x1017
olc2500l-1018              -RW-  1018  Field 0x1018
olc2500l-1019              -RW-  1019  Field 0x1019
olc2500l-101a              -RW-  101a  Field 0x101a
olc2500l-101b              -RW-  101b  Field 0x101b
olc2500l-101c              -RW-  101c  Field 0x101c
olc2500l-101d              -RW-  101d  Field 0x101d
olc2500l-101e              -RW-  101e  Field 0x101e
olc2500l-101f              -RW-  101f  Field 0x101f
olc2500l-1020              -RW-  1020  Field 0x1020
olc2500l-1021              -RW-  1021  Field 0x1021
olc2500l-1022              -RW-  1022  Field 0x1022
olc2500l-1023              -RW-  1023  Field 0x1023
olc2500l-1024              -RW-  1024  Field 0x1024
olc2500l-1025              -RW-  1025  Field 0x1025
olc2500l-1026              -RW-  1026  Field 0x1026
olc2500l-1027              -RW-  1027  Field 0x1027
olc2500l-1028              -RW-  1028  Field 0x1028

Maker Note (Olympus E-20,E-20N,E-20P)
  ole-0200                 -RW-  0200  Field 0x0200
  ole-0201                 -RW-  0201  Field 0x0201
  ole-0202                 -RW-  0202  Field 0x0202
  ole-0203                 -RW-  0203  Field 0x0203
  ole-0204                 -RW-  0204  Field 0x0204
  ole-0205                 -RW-  0205  Field 0x0205
  ole-0206                 -RW-  0206  Field 0x0206
  ole-0207                 -RW-  0207  Field 0x0207
  ole-0208                 -RW-  0208  Field 0x0208
  ole-0209                 -RW-  0209  Field 0x0209
  ole-0f00                 -RW-  0f00  Field 0x0f00
  ole-1000                 -RW-  1000  Field 0x1000
  ole-1001                 -RW-  1001  Field 0x1001
  ole-1002                 -RW-  1002  Field 0x1002
  ole-1003                 -RW-  1003  Field 0x1003
  ole-1004                 -RW-  1004  Field 0x1004
  ole-1005                 -RW-  1005  Field 0x1005
  ole-1006                 -RW-  1006  Field 0x1006
  ole-1007                 -RW-  1007  Field 0x1007
  ole-1008                 -RW-  1008  Field 0x1008
  ole-1009                 -RW-  1009  Field 0x1009
  ole-100a                 -RW-  100a  Field 0x100a
  ole-100b                 -RW-  100b  Field 0x100b
  ole-100c                 -RW-  100c  Field 0x100c
  ole-100d                 -RW-  100d  Field 0x100d
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   ole-100e                      -RW-   100e   Field 0x100e
   ole-100f                      -RW-   100f   Field 0x100f
   ole-1010                      -RW-   1010   Field 0x1010
   ole-1011                      -RW-   1011   Field 0x1011
   ole-1012                      -RW-   1012   Field 0x1012
   ole-1013                      -RW-   1013   Field 0x1013
   ole-1014                      -RW-   1014   Field 0x1014
   ole-1015                      -RW-   1015   Field 0x1015
   ole-1016                      -RW-   1016   Field 0x1016
   ole-1017                      -RW-   1017   Field 0x1017
   ole-1018                      -RW-   1018   Field 0x1018
   ole-1019                      -RW-   1019   Field 0x1019
   ole-101a                      -RW-   101a   Field 0x101a
   ole-101b                      -RW-   101b   Field 0x101b
   ole-101c                      -RW-   101c   Field 0x101c
   ole-101d                      -RW-   101d   Field 0x101d
   ole-101e                      -RW-   101e   Field 0x101e
   ole-101f                      -RW-   101f   Field 0x101f
   ole-1020                      -RW-   1020   Field 0x1020
   ole-1021                      -RW-   1021   Field 0x1021
   ole-1022                      -RW-   1022   Field 0x1022
   ole-1023                      -RW-   1023   Field 0x1023
   ole-1024                      -RW-   1024   Field 0x1024
   ole-1025                      -RW-   1025   Field 0x1025
   ole-1026                      -RW-   1026   Field 0x1026
   ole-1027                      -RW-   1027   Field 0x1027
   ole-1028                      -RW-   1028   Field 0x1028
   ole-1031                      -RW-   1031   Field 0x1031

Maker Note (Panasonic)
   pn-quality                    -RW-   0001   Image Quality
   pn-0002                       -RW-   0002   Field 0x0002
   pn-white-bal                  -RW-   0003   White Balance
   pn-focus-mode                 -RW-   0007   Focus Mode
   pn-spot-mode                  -RW-   000f   Spot Mode
   pn-stab-mode                  -RW-   001a   Image Stabiliser Mode
   pn-macro-mode                 -RW-   001c   Macro Mode
   pn-shoot-mode                 -RW-   001f   Shooting Mode
   pn-audio                      -RW-   0020   Audio Clip
   pn-0021                       -RW-   0021   Field 0x0021
   pn-0022                       -RW-   0022   Field 0x0022
   pn-white-adj                  -RW-   0023   White Balance Adjust
   pn-flash-bias                 -RW-   0024   Flash Bias
   pn-0025                       -RW-   0025   Field 0x0025
   pn-0026                       -RW-   0026   Field 0x0026
   pn-0027                       -RW-   0027   Field 0x0027
   pn-color-effect               -RW-   0028   Color Effect
   pn-0029                       -RW-   0029   Field 0x0029
   pn-002a                       -RW-   002a   Field 0x002a
   pn-002b                       -RW-   002b   Field 0x002b
   pn-contrast                   -RW-   002c   Contrast
   pn-noise-reduct               -RW-   002d   Noise Reduction
   pn-002e                       -RW-   002e   Field 0x002e
   pn-002f                       -RW-   002f   Field 0x002f
   pn-4449                       -RW-   4449   Field 0x4449

Maker Note (Pentax)
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```
px-mode                   -RW-   0001   Mode
px-prev-size              -RW-   0002   Preview Image Size
px-prev-len               -RW-   0003   Preview Image Length
px-prev-offset            -RW-   0004   Preview Image Offset
px-0005                   -RW-   0005   Field 0x0005
px-0006                   -RW-   0006   Field 0x0006
px-0007                   -RW-   0007   Field 0x0007
px-quality                -RW-   0008   Quality
px-image-size             -RW-   0009   Image Size
px-zoom                   -RW-   000a   Zoom
px-picture-mode           -RW-   000b   Picture Mode
px-000c                   -RW-   000c   Field 0x000c
px-focus-mode             -RW-   000d   Focus Mode
px-000e                   -RW-   000e   Field 0x000e
px-000f                   -RW-   000f   Field 0x000f
px-0010                   -RW-   0010   Field 0x0010
px-0012                   -RW-   0012   Field 0x0012
px-0013                   -RW-   0013   Field 0x0013
px-iso                    -RW-   0014   ISO Setting
px-0015                   -RW-   0015   Field 0x0015
px-meter-mode             -RW-   0017   Meter Mode
px-0018                   -RW-   0018   Field 0x0018
px-white-bal              -RW-   0019   White Balance
px-001a                   -RW-   001a   Field 0x001a
px-focal-len              -RW-   001d   Focal Length
px-zoom                   -RW-   001e   Zoom
px-satur-comp             -RW-   001f   Saturation Compensation
px-contrast-comp          -RW-   0020   Contrast Compensation
px-sharp-comp             -RW-   0021   Sharpness Compensation
px-0022                   -RW-   0022   Field 0x0022
px-0023                   -RW-   0023   Field 0x0023
px-0024                   -RW-   0024   Field 0x0024
px-0025                   -RW-   0025   Field 0x0025
px-0026                   -RW-   0026   Field 0x0026
px-0027                   -RW-   0027   Field 0x0027
px-0028                   -RW-   0028   Field 0x0028
px-0029                   -RW-   0029   Field 0x0029
px-002b                   -RW-   002b   Field 0x002b
px-002c                   -RW-   002c   Field 0x002c
px-002d                   -RW-   002d   Field 0x002d
px-0032                   -RW-   0032   Field 0x0032
px-0033                   -RW-   0033   Field 0x0033
px-0034                   -RW-   0034   Field 0x0034
px-0035                   -RW-   0035   Field 0x0035
px-0036                   -RW-   0036   Field 0x0036
px-0037                   -RW-   0037   Field 0x0037
px-003a                   -RW-   003a   Field 0x003a
px-003d                   -RW-   003d   Field 0x003d
px-003e                   -RW-   003e   Field 0x003e
px-lens-id                -RW-   003f   Lens Id
px-0041                   -RW-   0041   Field 0x0041
px-0047                   -RW-   0047   Field 0x0047
px-0048                   -RW-   0048   Field 0x0048
px-0049                   -RW-   0049   Field 0x0049
px-004f                   -RW-   004f   Field 0x004f
px-print-im               -RW-   0e00   Print IM
px-0200                   -RW-   0200   Field 0x0200
```

```
  px-0201                        -RW-   0201   Field 0x0201
  px-0202                        -RW-   0202   Field 0x0202
  px-0203                        -RW-   0203   Field 0x0203
  px-0204                        -RW-   0204   Field 0x0204
  px-0205                        -RW-   0205   Field 0x0205
  px-0206                        -RW-   0206   Field 0x0206
  px-0207                        -RW-   0207   Field 0x0207
  px-0208                        -RW-   0208   Field 0x0208
  px-0209                        -RW-   0209   Field 0x0209
  px-020a                        -RW-   020a   Field 0x020a
  px-020b                        -RW-   020b   Field 0x020b
  px-020d                        -RW-   020d   Field 0x020d
  px-020e                        -RW-   020e   Field 0x020e
  px-020f                        -RW-   020f   Field 0x020f
  px-0210                        -RW-   0210   Field 0x0210
  px-0211                        -RW-   0211   Field 0x0211
  px-0212                        -RW-   0212   Field 0x0212
  px-0213                        -RW-   0213   Field 0x0213
  px-0214                        -RW-   0214   Field 0x0214
  px-0215                        -RW-   0215   Field 0x0215
  px-0216                        -RW-   0216   Field 0x0216
  px-021f                        -RW-   021f   Field 0x021f
  px-03ff                        -RW-   03ff   Field 0x03ff
  px-time-zone                   -RW-   1000   Time Zone
  px-daylight-sav                -RW-   1001   Daylight Savings


Maker Note (Ricoh)
  ro-0001                        -RW-   0001   Field 0x0001
  ro-0002                        -RW-   0002   Field 0x0002
  ro-0003                        -RW-   0003   Field 0x0003
  ro-0005                        -RW-   0005   Field 0x0005
  ro-0006                        -RW-   0006   Field 0x0006
  ro-1001                        -RW-   1001   Field 0x1001
  ro-1002                        -RW-   1002   Field 0x1002
  ro-2001                        -RW-   2001   Camera Info Sub-IFD


Maker Note (Ricoh Camera Info)
  ri-0001                        -RW-   0001   Field 0x0001
  ri-0002                        -RW-   0002   Field 0x0002
  ri-0003                        -RW-   0003   Field 0x0003
  ri-0005                        -RW-   0004   Field 0x0005
  ri-0006                        -RW-   0006   Field 0x0006
  ri-0007                        -RW-   0007   Field 0x0007
  ri-0008                        -RW-   0008   Field 0x0008
  ri-0009                        -RW-   0009   Field 0x0009
  ri-000a                        -RW-   000a   Field 0x000a
  ri-000b                        -RW-   000b   Field 0x000b
  ri-000c                        -RW-   000c   Field 0x000c
  ri-000d                        -RW-   000d   Field 0x000d
  ri-000e                        -RW-   000e   Field 0x000e
  ri-000f                        -RW-   000f   Field 0x000f
  ri-0010                        -RW-   0010   Field 0x0010
```

8.7 Canon Raw (.CRW) Fields

```
  ------- Field Name ------ -Attr- -Tag- ----- Description ----------
  crw-date                       -R--   0000   Date/Time Taken
```

```
crw-file-format         -R--  0178  File Format
crw-owner               -R--  01d2  Owner
crw-vendor              -R--  01f2  Vendor
crw-model               -R--  01f8  Camera Model
crw-firm-ver            -R--  0212  Firmware Version
crw-serial-num          -R--  0236  Camera Serial Number
crw-iso                 -R--  0288  ISO Setting
crw-shutter             -R--  02b0  Shutter Speed
crw-aperture            -R--  02ae  Aperture (F-stop)
crw-creative-mode       -R--  02e2  Creative Mode
crw-autofocus-mode      -R--  02c8  Autofocus Mode
crw-meter-mode          -R--  02dc  Meter Mode
crw-photo-in-seq        -R--  0296  Photo no. in Sequence
crw-bulb-duration       -R--  02b4  Bulb Duration
crw-shutter-delay       -R--  02be  Shutter Delay
crw-drive-mode          -R--  02c4  Drive Mode
crw-white-point         -R--  0292  White Point
crw-exp-comp            -R--  0290  Exposure Compensation
crw-focus-lower         -R--  02aa  Focus Distance Lower (m)
crw-focus-upper         -R--  02ac  Focus Distance Upper (m)
crw-zoom-lower          -R--  02e8  Zoom Range Lower (mm)
crw-zoom-upper          -R--  02ea  Zoom Range Upper (mm)
crw-focal-len-used      -R--  152e  Focal Length Used
crw-flash-comp          -R--  02a2  Flash Compensation (EV)
crw-param-contrast      -R--  02d4  Contrast (parameter)
crw-param-saturation    -R--  02d6  Saturation (parameter)
crw-param-sharpness     -R--  02d8  Sharpness (parameter)
crw-param-tone          -R--  030e  Color Tone (parameter)
crw-flash-mode          -R--  02c2  Flash Mode
crw-orient              -R--  15f4  Orientation
crw-rotation            -R--  000c  Rotation (degrees)
crw-aeb-seq             -R--  02a4  AE Bracket Sequence
crw-aeb-value           -R--  02a6  AE Bracket Value (EV)
crw-custom-2            -R--  0f1c  Custom Field 2
crw-custom-3            -R--  0f1e  Custom Field 3
crw-custom-4            -R--  0f20  Custom Field 4
crw-custom-5            -R--  0f22  Custom Field 5
crw-custom-6            -R--  0f24  Custom Field 6
crw-custom-7            -R--  0f26  Custom Field 7
crw-custom-8            -R--  0f28  Custom Field 8
crw-custom-9            -R--  0f2a  Custom Field 9
crw-custom-10           -R--  0f2c  Custom Field 10
crw-custom-11           -R--  0f2e  Custom Field 11
crw-custom-12           -R--  0f30  Custom Field 12
crw-custom-13           -R--  0f32  Custom Field 13
crw-custom-14           -R--  0f34  Custom Field 14
crw-custom-15           -R--  0f36  Custom Field 15
```

8.8 IPTC Fields

Refer to Section 8.1 for an explanation of the field information shown here.

```
  ------- Field Name ------ -Attr- -Tag- ----- Description ----------
IPTC 1: Addressing
  ip1-version               -RWS  1.000 Dataset 1 Record Version
  ip1-destination           -RWS  1.005 Destination
  ip1-format                -RWS  1.020 File Format
  ip1-format-ver            -RWS  1.022 File Format Version
  ip1-service-id            -RWS  1.030 Service Identifier
  ip1-env-num               -RWS  1.040 Envelope Number
  ip1-product-id            -RWS  1.050 Product ID
  ip1-env-pri               -RWS  1.060 Envelope Priority
  ip1-date-sent             -RWS  1.070 Date Sent
  ip1-time-sent             -RWS  1.080 Time Sent
  ip1-char-set              -RWS  1.090 Coded Character Set
  ip1-uno                   -RWS  1.100 Unique Name of Object
  ip1-arm-id                -RWS  1.120 ARM Identifier
  ip1-arm-ver               -RWS  1.122 ARM Version

IPTC 2: Editorial
  ip-version                IRWS  2.000 Dataset 2 Record Version
  ip-obj-type-ref           IRWS  2.003 Object Type Reference
  ip-obj-attr-ref           IRWS  2.004 Object Attribute Reference
  ip-object                 IRWS  2.005 Object
  ip-edit-status            IRWS  2.007 Edit Status
  ip-editor-update          IRWS  2.008 Editorial Update
  ip-urgency                IRWS  2.010 Urgency
  ip-subj-ref               IRWS  2.012 Subject Reference
  ip-category               IRWS  2.015 Category
  ip-suppcat                IRWS  2.020 Supplemental-Categories
  ip-fixture                IRWS  2.022 Fixture
  ip-keyword                IRWS  2.025 Keywords
  ip-cont-loc-code          IRWS  2.026 Content Location Code
  ip-cont-loc-name          IRWS  2.027 Content Location Name
  ip-rel-date               IRWS  2.030 Release Date
  ip-rel-time               IRWS  2.035 Release Time
  ip-exp-date               IRWS  2.037 Expiration Date
  ip-exp-time               IRWS  2.038 Expiration Time
  ip-instructions           IRWS  2.040 Special Instructions
  ip-action-advised         IRWS  2.042 Action Advised
  ip-ref-service            IRWS  2.045 Reference Service Ident.
  ip-ref-date               IRWS  2.047 Reference Date
  ip-ref-env-num            IRWS  2.050 Reference Envelope Number
  ip-date                   IRWS  2.055 Creation Date
  ip-time                   IRWS  2.060 Creation Time
  ip-digi-date              IRWS  2.062 Digital Creation Date
  ip-digi-time              IRWS  2.063 Digital Creation Time
  ip-program                IRWS  2.065 Originating Program
  ip-prog-ver               IRWS  2.070 Program Version
  ip-obj-cycle              IRWS  2.075 Object Cycle
  ip-byline                 IRWS  2.080 Byline
  ip-byline-title           IRWS  2.085 Byline Title
  ip-city                   IRWS  2.090 City
  ip-subloc                 IRWS  2.092 Sub Location
```

```
    ip-state-prov              IRWS   2.095 State/Province
    ip-loc-code                IRWS   2.100 Location Code
    ip-country                 IRWS   2.101 Country
    ip-orig-ref                IRWS   2.103 Original Xmit Reference
    ip-headline                IRWS   2.105 Headline
    ip-credit                  IRWS   2.110 Credit
    ip-source                  IRWS   2.115 Source
    ip-copyright               IRWS   2.116 Copyright Notice
    ip-contact                 IRWS   2.118 Contact
    ip-caption                 IRWS   2.120 Caption
    ip-local-caption           IRWS   2.121 Local Caption
    ip-cap-writer              IRWS   2.122 Caption Writer
    ip-image-type              IRWS   2.130 Image Type
    ip-image-orient            IRWS   2.131 Image Orientation
    ip-lang-id                 IRWS   2.135 Language Id
    ip-audio-type              IRWS   2.150 Audio Type
    ip-audio-samp-rate         IRWS   2.151 Audio Sampling Rate (Hz)
    ip-audio-samp-res          IRWS   2.152 Audio Sampling Resolution
    ip-audio-duration          IRWS   2.153 Audio Duration
    ip-audio-outcue            IRWS   2.154 Audio Outcue
    ip-job-id                  IRW-   2.184 Jod Id
    ip-master-doc-id           IRW-   2.185 Master Document Id
    ip-short-doc-id            IRW-   2.186 Short Document Id
    ip-unique-doc-id           IRW-   2.187 Unique Document Id
    ip-owner-id                IRW-   2.188 Owner Id
    ip-preview-format          IRWS   2.200 Preview File Format
    ip-service-id              IRWS   2.201 Service Id
    ip-class-state             IRW-   2.225 Classification State
    ip-sim-index               IRW-   2.228 Similarity Index
    ip-doc-notes               IRW-   2.230 Document Notes
    ip-doc-history             IRW-   2.231 Document History
    ip-exif-info               IRW-   2.232 Camera EXIF Information

IPTC 3: Newsphoto Parameters
    ip3-version                -RWS   3.000 Dataset 3 Record Version
    ip3-picture-num            -RWS   3.010 Picture Number
    ip3-width                  -RWS   3.020 Image Width
    ip3-height                 -RWS   3.030 Image Height
    ip3-pix-size-scan          -RWS   3.040 Pixel Size - Scan Dirctn
    ip3-pix-size-perp          -RWS   3.050 Pixel Size - Perpedicular
    ip3-supp-type              -RWS   3.055 Supplemental Type
    ip3-color-rep              -RWS   3.060 Color Representation
    ip3-color-space            -RWS   3.064 Interchange Color Space
    ip3-color-seq              -RWS   3.065 Color Sequence
    ip3-index-entries          -RWS   3.084 Number of Index Entries
    ip3-bits-per-sample        -RWS   3.086 Bits per Sample
    ip3-sample-struct          -RWS   3.090 Sample Structure
    ip3-scan-dir               -RWS   3.100 Scanning Direction
    ip3-rotation               -RWS   3.102 Image Rotation (degrees)
    ip3-data-comp              -RWS   3.110 Data Compression Method
    ip3-quant-method           -RWS   3.120 Quantization Method
    ip3-end-points             -RWS   3.125 End Points
    ip3-excursion              -RWS   3.130 Excursion Tolerance
    ip3-bits-per-comp          -RWS   3.135 Bits per Component

IPTC 7: Subfile Size
    ip7-size-mode              -RWS   7.010 Size Mode
```

```
ip7-max-subfile              -RWS  7.020 Max Subfile Size
ip7-obj-size                 -RWS  7.090 Object Size Announced

Photoshop
  ip-copyrighted             -RW-  ----- Mark as Copyrighted
  ip-url                     -RW-  ----- Image URL
```

8.9 Ricoh RMETA Fields

```
  ------- Field Name ------ -Attr- -Tag- ----- Description ----------
  rc-name1                   -R--  0001  Custom Field 1 Name
  rc-value1                  -R--  0001  Custom Field 1 Value
  rc-name2                   -R--  0002  Custom Field 2 Name
  rc-value2                  -R--  0002  Custom Field 2 Value
  rc-name3                   -R--  0003  Custom Field 3 Name
  rc-value3                  -R--  0003  Custom Field 3 Value
  rc-name4                   -R--  0004  Custom Field 4 Name
  rc-value4                  -R--  0004  Custom Field 4 Value
  rc-name5                   -R--  0005  Custom Field 5 Name
  rc-value5                  -R--  0005  Custom Field 5 Value
```

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10 Version History

10.1 Version 2.7

10.1.1 New Features

- o Add "read only" support for EXIF fields in Encapsulated Postscript (.eps) files.
- o Add support for Ricoh Maker Note fields
- o Add read only support for Ricoh RMETA Custom Fields (created by Ricoh Ricoh Pro G3 GPS-capable camera).
- o Improved support for non-ASCII character sets:
  - Add support for viewing and editing Windows XP specific UNICODE fields.
  - Added /u option to exifedit to specify that EXIF Comment fields are to be stored in UNICODE (previous only ASCII comments were supported).
  - The /p option has been added to set the character sets used to interpret EXIF and IPTC text fields. Environment variables can also be used to specify characters sets.
  - Added /i option to exiflist, to display the character sets being used.
- o Add support for XP Digital Image Pro Tags field (0x4747)
- o Increase max length of ip-keyword field from 32 to 1999 characters.
- o Add list of defined values for IPTC Coded Character Set field (1:90), nickname ip1-char-set.
- o If the demoninator of the exp-time value is not a whole number to two decimal places, then display it's value to two decimal places.

10.1.2 Bug Fixes

- o Fix bug where two fields had the same nickname (n3-color-mode). Second occurence of the field was renamed to n3-color-mode2.
- o Make handling of invalid 'next IFD' offset pointers more robust. In previous versions invalid offset pointers cause a "too many format errors" message and resulted in incomplete EXIF data.
- o Fix bug in handling of TIFF strip offsets and lengths with datatype SHORT.
- o Fix bug in exiflist -t option that caused extracted thumbnail to be incorrect for some Nikon images. The problem occured when there were two thumbnails in the image, one of which was in the Nikon Maker note.
- o Rename "Nikon NEF Thumbnail" IFD to "Nikon Thumbnail" as this IFD can also appear in JPEG files.
- o Fix bug in editing files containing Thumbnails embedded in Nikon Maker Notes
- o Fix bug that caused incorrect values to be set when IPTC values were being both set and used as template values in the same exifedit command.
- o Improve validation of command arguments containing "@" file input as invalid values could cause the program to crash.

10.2 Version 2.6

- o Canon Raw (.CRW and .CR2) files now supported by `exiflist`, `exifcopy`, and `exiffile`.
- o Improved support for model-specific fields (Maker Notes)
  - o Panasonic Maker Notes now supported
  - o Konica Minolta branded cameras now supported
  - o Pentax Maker Note Lens Id field (px-lens-id) now supported.
- o Can now reference individual parts of the Date Taken EXIF field using the following new nicknames:
  - `yyyy` - 4 digit year
  - `yy` - 2 digit year
  - `mm` - 2 digit month
  - `mmm` - 3 letter month (eg. Jan)
  - `hr` - 2 digit hour (24 hour clock)

```
                     -   min    - 2 digit minutes
                     -   sec    - 2 digit seconds
```
o Improved GPS support. GPS seconds values to be specified to 2 decimal places (previously only integer whole numbers of seconds were accepted).
o Add support for more iptc fields:

```
------- Field Name ------ -Attr- -Tag- ----- Description ----------
- ip-local-caption         IRWS  2.121 Local Caption
- ip-job-id                IRW-  2.184 Jod Id
- ip-master-doc-id         IRW-  2.185 Master Document Id
- ip-short-doc-id          IRW-  2.186 Short Document Id
- ip-unique-doc-id         IRW-  2.187 Unique Document Id
- ip-owner-id              IRW-  2.188 Owner Id
- ip-class-state           IRW-  2.225 Classification State
- ip-sim-index             IRW-  2.228 Similarity Index
- ip-doc-notes             IRW-  2.230 Document Notes
- ip-doc-history           IRW-  2.231 Document History
- ip-exif-info             IRW-  2.232 Camera EXIF Information
```

o Binary fields can now be edited.
o Bug fixes
  ▪ Ensure padding bytes in IPTC data are zeroed, as Photoshop does not accept non-zero padding.
  ▪ Fix error in exifdate usage text
  ▪ Fix detection of EXIF data in Minolta raw (.MRF) files from Minolta 7D SLR
  ▪ Fix double processing of renamed files in exiffile when run on WindowsXP.
  ▪ Fix handling of EXIF thumbnails in TIFF, NEF, and .DCR files.

10.3 Version 2.5

10.3.1 exifedit

- Edit IPTC fields, and copy field values between IPTC fields and EXIF fields (and vice versa)
- exifedit can now process all files in a directory tree. Previously could only process all files in a single directory.
- Setting date/time field made simpler. Previously you had to specify the date time in exactly the right format. Now exifedit will accept a number of different date formats and will automatically convert to the required format. Also, if a date is specified when I date/time is required, the time will automatically be set to 00:00:00.
- EXIF data/time values can be assigned to IPTC date/time fields (and vice versa) and the value will automatically be converted to the correct format.
- can now individually remove all EXIF, IPTC, or Flashpix audio data from an image
- In field/value lists, field values containing spaces no longer need to be enclosed in quotes. For example, the following is now valid:
  > exifedit -a "date-taken=2004:03:31 12:13:00" myphoto.jpg
  in previous versions an additional set of quotes was required:
  > exifedit -a "description=\"2004:03:31 12:13:00\"" myphoto.jpg
- -j option added. Specifies the separator character to use between repeating IPTC fields (eg ip-keyword and ip-suppcat)

10.3.2 exiflist

- Limit on size of template file removed (previously the maximum was 10,000 bytes; it si now limited only by available memory).
- IPTC fields now included in .exi files created with the -e option
- -n option added. Specifies the character with which to replace new line characters in output values.
- -t -w -e can now be used in conjunction with -r to extract thumbnails, audio data, and meta data from all files in a directory tree.

- -j option added. Specifies the separator character to use between repeating IPTC fields (eg ip-keyword and ip-suppcat)

10.3.3   exifcopy

- When copying between JPEG files, Flashpix and IPTC fields now copied (previously only EXIF data was copied).

10.3.4   Miscellaneous

- Minor corrections to Minolta Maker Note fields
- Add TIFF Document Storage and Retrieval tags
- Pentax Maker Notes now supported.
- Maker notes formats for major brands now automatically detected

10.3.5   Bug Fixes

- Editing TIF files that contained a single strip thumbnail caused an invalid TIF file to be generated
- GPS latitude and longitude values were incorrectly being treated as signed values instead of unsigned.
- Windows XP related issues
  - WINDIR not defined on all WindowsXP systems. Use SYSTEMROOT instead.
  - When processing all files in a directory using exifedit or exifcopy, on some systems the command would processed generated backup files in a directory

10.4 Version 2.4

The following new features have been introduced in V2.4:
- Additional file types supported
  - **Minolta Raw (.MRW) files:** All EXIF fields can be listed. The entire EXIF data block can be copied into a JPEG file or into an EXIF .EXI file. Selected EXIF fields can be copied to any other image file type. Minolta Raw files cannot be editied.
  - **Fujifilm Raw (.RAF) files:** All EXIF fields can be listed. Selected EXIF fields can be copied to any other image file type. Fujifilm Raw files cannot be editied.
  - **EXIF .EXI files:** .EXI files are used to backup EXIF information from other image file for later return after the image has been edited. Using the `exiflist /e` option, all EXIF data can be extracted from a .JPG, .MRW, or .RAF file and stored in a .EXI file. EXIF information in a .EXI file can then be copied into any other image file using `exifcopy`. The .EXI files created by EXIFutils are compatible with those created by the exifer application (www.friedemann-schmidt.com/software/exifer).
- Improved Maker Note support
  - Support for Canon Maker Note fields greatly improved. In earlier versions of EXIFutils many Canon Maker note values where combined into two fields "Settings 1" and "Settings 4". All Canon Maker note fields can now b e individually selected and displayed.
  - Most Minolta Maker Note fields are now interpreted (previously the meaning of most fields was unknown).
  - Maker Notes for the following cameras are now supported:
    - Canon Powershot S45, S50, A300, A60 ,A70 , G3, G5 ,S400, SD100, 10D, Digital Rebel.
    - Casio EX-Z3, EX-S3, QV-5700, QV-R40
    - Fujifilm FinePix A205, A210, A310, F410, S5000
    - Minolta DiMAGE 7Hi, Xi, Xt, Z1, A1, F300
    - Nikon E3100, E5400, SQ
    - Olympus C750UZ, X200, D560Z, C350Z, u10D, S300D, u300D, u20D, S400D, u400D.
- More IPTC fields now supported. 56 more IPTC fields can are now be displayed, include fields from Dataset 1 (Addressing), Dataset 2 (Editorial), and Dataset 7 (Subfile Size).
- Additional image file attributes available as fields for use in output and templates:
  - `file-date-mod`   - Date the file was last modified
  - `file-date-created`   - Date the file was created (Windows only)

- o　`file-name-exi`　　　- Default name of the `.exi` file created by `exiflist /e` option.
- o　The User Guide has been split into three separate documents:
  - o　A Getting Started Guide, which describes concepts common to all EXIFutils commands, and explains common scenarios in which EXIFutils can be used.
  - o　A Command Reference Manual, which describes in detail the features provided by each EXIFutils command.
  - o　A Field Reference Guide, which list all EXIF, IPTC, and file attributes fields that can be used by EXIFutils.

The following problems have been fixed:

- o　General
  - o　Absolute path name in thumbnail template did not work on Windows ("C:\" was translated to"C-\").
  - o　Handling of incorrectly formatted IPTC fields made more fault tollerant.
  - o　Spurious characters appended to some character strings when displayed.
  - o　On Windows, the /? option was not being recognized. It is now produces usage information (the same as /h).
- o　exifcopy
  - o　spaces in file names not handled when –f option used
- o　exifdate
  - o　When adding or subtracting a date/time value, the addition/subtraction was applied to the date-modified field twice.
- o　exifedit
  - o　When adding a large thumbnail image using the –t a option, a corrupt EXIF data block was created if the thumbnail image was too large to fit in the EXIF block. An error message is now displayed if the thumbnail is too large.
- o　exifkey
  - o　A Sementation Fault occurred if the license file could not be read.
  - o　Trailing space characters in the username or email address caused exifkey to hang.
- o　exiflist
  - o　The ip-image-type and ip-lang-id field were not being displayed even if they were present.
  - o　When using list output (-o l… option) field value strings containing the separator character were not being quoted

10.5　Version 2.3

Command	Feature	Description	For more information see
General	EXIF V2.2	EXIF 2.2 fields are now supported (previously only EXIF V2.1 fields were supported)	
	IPTC fields	IPTC (International Press Telecommunications Council) fields can now be displayed.	
	Improved Maker Note supported	Added support for the following cameras: 　o　Olympus C5050Z, 　o　Fujifilm FinePix F401, 　o　Minolta DiMAGE F100, 　o　Nikon D1, 　o　Canon G1, 　o　Canon G2 Improved support for Nikon Type 3 Maker Notes	

	New file-related nicknames	Additional file attribute nicknames have been defined: o `file-ext` (file name extension) o `file-base` (file base name) o `file-name-thumb` (file name of extracted thumbnail) o `file-name-audio` (file name of extracted audio stream) o `file-name-backup` (name of backup file to be created)	
	Nicknames case insensitive	Nicknames can now be entered in both upper and lower case (in V2.2 nicknames had to be entered in lower case)	
exiflist	New, flexible output format	In addition to predefine output formats, `exiflist` now supports output based on a user-defined *template* file.	Section 6 "Templates".
	Can specify name/dir of thumbnail to be created	When extracting the embedded thumbnail image using the `/t` option, the user can now specify the name of the extracted file, and the directory into which it is written.	Section 7.6.3 "Thumbnail Image Extraction"
	Can specify name/dir of WAV file to be created	When extracting the embedded audio stream using the `/w` option, the user can now specify the name of the extracted file, and the directory into which it is written.	Section 7.6.5 "Audio Stream Extraction"
exifedit	Set fields based on the value of other fields	The value to which a field is set can now be specified as a *template* that includes the values of other fields.	Section 6 "Templates". Section 7.3 "EXIFEDIT"
exiffile	Rename files based on field values	exiffile has a new `/n` option, which renames images files based on the values of other EXIF, IPTC, and field attribute nicknames.	Section 7.4.1.1 "Renaming Files"
exifcopy	exifcopy `/f` now works for JPG-JPG copies	It is now possible to copy individual fields from one JPG file to another JPG file (previously all fields were copied)	Section 7.1.1.2 "Supported Image File Types"

The following problems have been fixed:
- General
  - o /r not handled correctly in string fields
  - o Temporary files were sometimes created in the current working directory in which the program was run, instead of being created in the same dir as the file being edited/copied to.
  - o Some Olympus and Minolta Maker Note field definitions were incorrect, causing warning messages to be erroneously displayed.
- exiflist
  - o String values were not wrapped correctly when last character on the line was white space.
  - o Random text appended to the end of some strings output values.
  - o file-name nickname interpreted as file-name-full in SQL output
  - o Directory name incorrectly included in the file-name field when a path was included on command line
  - o exiflist reported shutter speeds written by exifedit as a power of 2 lower than the correct value.
- exifedit
  - o Generated Backup file names and thumbnail file names not correct when dash '.' was the first character of the file name
  - o Multiple APP1 markers in an JPG file caused EXIFEDIT to generate a corrupt JPG file.
  - o exifedit incorrectly formats FUJIFILM Maker Notes field for some Fujifilm models.

- o Temporary thumbnail files were not always deleted
- exifcopy
  - o File names starting with a dash '-' not handled correctly by exifcopy (UNIX only)

10.6 Version 2.2

GENERAL

1. Added Maker Note support for the following makes/models:
   - o Canon PowerShot S20
   - o Canon PowerShot Pro90 IS
   - o Casio QV-3000EX
   - o Casio QV-3EX
   - o Casio QV-4000
   - o Epson PhotoPC 3000Z
   - o Epson PhotoPC 3100Z
   - o Fujifilm FinePix F601 ZOOM
   - o Fujifilm FinePix S602 ZOOM
   - o Fujifilm FinePix 4700 ZOOM
   - o Fujifilm FinePix 4800 ZOOM
   - o Fujifilm FinePix 4900 ZOOM
   - o Fujifilm FinePix 6800 ZOOM
   - o Fujifilm FinePix 6900 ZOOM
   - o Fujifilm FinePix S2 Pro
   - o Minolta DiMAGE 5
   - o Minolta DiMAGE 7i
   - o Nikon E880
   - o Nikon E885
   - o Nikon E995
   - o Nikon E5000
   - o Nikon E4500
   - o Nikon E5700
   - o Nikon D1H
   - o Nikon D100
   - o Olympus C3000Z
   - o Olympus C300Z
   - o Olympus D550Z
   - o Olympus C3030Z
   - o Olympus C3040Z
   - o Olympus C3100Z
   - o Olympus C3020Z
   - o Olympus C4040Z
   - o Olympus C40Z
   - o Olympus C720UZ
   - o Olympus E-10
2. Fix minor EXIF specification conformance issues:
   - a. exiflist assumed first IFD always started at offset 8. It now correctly determines the offset to the EXIF data.
   - b. User Comment field was sometimes not placed in field tag order within the EXIF data
   - c. Related Sound File field was incorrectly defined as variable length. Correct definition is as a 12 character fixed length field.
   - d. EXIF data type 13 (IFD offset) now supported.
3. Add definitions for Windows XP specific fields.

EXIFEDIT

1. exifedit can now add EXIF data to an image file that did not contain EXIF data (previously exifcopy had to be used to add EXIF data to a file before exifedit could be used to edit the fields). If exifedit is used

with the '/a', '/s', or '/t a' options, and the file does not contain any EXIF data, then exifedit will create a basic EXIF structure before adding the specified fields.
2. Added /e option to remove all EXIF data from the image file (i.e. all APP1 EXIF data blocks and all APP2 FlashPix Extension data blocks will be deleted).
3. Add /t a,@filename option to replace thumbnail image with a user-supplied JPEG thumbnail image.

EXIFLIST
1. Added /w option to extract embedded EXIF audio data into a separate .wav audio file.
2. Added /k option to allow user to specify an alternative quote character for /o ln format output.
3. Fixed bugs in escaping of quote characters:
    a. In '/o ln' format output, double quotes characters (") were not preceded by the escape character when they occurred within field values
    b. In SQL format output, an escape character did not precede single quote characters when they occurred within field values.
4. In SQL format output, all string field values should be surrounded by quote characters. This was not being done for all fields.

10.7 Version 2.1

EXIFEDIT
1) Added improved thumbnail generation. The /t option can now be specified in three different forms:
　/t a　　　　　- generate a thumbnail that is 160x120 pixels
　/t a,size　　- generate a thumbnail that has its longest dimension 'size' pixels long, with the length of the shorter side scaled to maintain the image aspect ratio, eg /t a,300
　/t a,wwwxhhh - generate a thumbnail that is www pixels wide and hhh pixels high, eg /t a,300x200

10.8 Version 2.0

GENERAL
1. First Shareware version.
2. Added support for TIFF files. Other file formats based on the TIFF standard may also work
3. Can copy/merge fields between JPG and TIFF files or between two TIFF files.
4. New utility EXIFFILE that sets the JPG or TIFF file's last modified date to the date the photo was taken.
5. Increase maximum number of fields that can be specified (for listing or edit) to 200 (was previously 20).
6. Add proper installation process added (Windows version only)
7. Use Guide now included.
8. Add support for more Maker Note fields:
    a. Olympus E-20, E20-N, E-20P
    b. Canon PowerShot S40
    c. Canon PowerShot A20
    d. Nikon D1X
    e. Epson PhotoPC 850Z
    f. Minolta DiMAGE 7
9. Windows version now accepts UNIX-style command options i.e. option parameters can start with '-' instead of '/'. For example, both of the following are now valid in the Windows version:
    　　exiflist /o l /f file-name,date-taken .
    　　exiflist -o l -f file-name,date-taken .

EXIFLIST
1. Added support for more Canon Make Note fields (Quality, Digital Zoom, Focus Type, Flash Activity).
2. Unknown fields are now printed in the IFD in which they are found rather than being listed together at the end.

3. File Source and Scene Type now interpretted correctly.
4. Added the /o lf and /o ln options /l option now requires a suboption. Valid values are '/l n' (list field names
    - this is what /l alone did in V1.5), '/l f' (print a full list of fields and details of valid field values to be used
    when editing, '/l field-name-list' (similar to '/l f' but only prints details for selected fields.
5. Can now use wildcards when specifying fields in the /f option.
6. Can now specify /f exif-common to select all common EXIF fields
7. Fix bug which caused an extra comma to be included at the end of the heading line when /o lh option
    used.

EXIFEDIT
1. Can now add/replace/delete most fields. See 'exiflist /l f' command for a complete list of the fields that
    are now editable.
2. Can automatically adjust the width and height fields to match the actual image size
3. Fix buffer overrun problem if field value longer than maximum
4. Bug fix: Editing EXIF data that contained GPS information caused invalid EXIF data to be written.
5. Added '/t a' to regenerate thumbnails

EXIFCOPY
1. /m option will now accept a match length of zero, which means that all destination files will match.
2. Can now copy selected fields to/from tiff files.
3. Incompatibilities:
    a. -f changed to –o
    b. backup files now suffixed with -be instead of -nx

10.9 Version 1.5

GENERAL
1. Fixed bug in handling of EXIF data larger than 2KB.

EXIFLIST
2. Added /t option, which extract the thumbnail image from the EXIF data into a separate file.
3. Added support for Global Positioning System (GPS) fields
4. Added support for reading field list (/f option) from standard input
5. Added support for the following Maker Note Fields
    a. Olympus C2500L
    b. Fujifilm
    c. Minolta DiMAGE 7 (basic support only)
    d. - Nikon D1X (basic support only)
    "Basic support" means that the field values are displayed, but the names and meanings of the fields
    are not known

EXIFEDIT
1. Added support for reading field lists (/a /r options) from standard input
2. "/t" option changed to "/t r" in preparation for adding more thumbnail actions (add thumbnail is planned)
3. Fixed bug in generation of Maker Note fields. This bug caused some EXIF display programs to fail to
    displaying Make Note fields (see below for more details).
4. Fixed bug in order of generated EXIF fields. The EXIF structure written by EXIFEDIT did not conform to
    the EXIF standard in that fields were not order in ascending order by field tag. As far as I know this error
    did not cause any problems, but it has now been corrected so that the fields are written in the order
    required by the EXIF Specification.
5. There was a bug in the generation of Maker Note fields which caused the Maker Note tag to have a data
    type of UNSIGNED LONG and a length of 1. It should have had a data type of UNDEFINED and the
    length set to the length of the Make Note data. This error caused some EXIF display programs to fail to

display make note fields created by EXIFEDIT. If you have encountered this problem you can fix the Make Note field by editting the EXIF data again using this new version of EXIFEDIT.

10.10 Version 1.4

GENERAL
1. Added support for Canon ShowerShot Maker Note
2. Minor corrections to field definitions in Casio Maker Note
3. Removed most warnings when compiling on VC6

EXIFLIST
1. Maximum display size for field values increases from 300 to 500 bytes
2. Long field values now wrap at a punctuation mark instead of at maximum line length.

10.11 Version 1.3

GENERAL
1. First production release of EXIFEDIT (a Beta release was included in EXIFutils V1.2)

EXIFLIST
1. Now supports Nikon E990 Maker Note.
2. The meaning of the "file-name" psuedo-field has been changed. In previous versions it contained the full file path and file name. It now contains only the file name. To get the path see the file-name-full and file-dir psuedo-fields described below.
3. Two new pseudo-fields have been added:
    a. file-name-full - the full path and file name to the file.
    b. file-dir   - the directory in which the file was found.
4. Support for the following string fields added:
    a. image-history
    b. artist
   NOTE: I'm not sure how "standard" these fields are. The EXIF documentation lists them under "miscellaneous fields". If the display program you are using does not support these fields then it should ignore them.

EXIFEDIT
1. Support for the following string fields added:
    a. image-history
    b. artist
   NOTE: I'm not sure how "standard" these fields are. The EXIF documentation lists them under "miscellaneous fields". If the display program you are using does not support these fields then it should ignore them.

10.12 Version 1.2

GENERAL
1. Windows version now built using Visual C++ V6.0
2. Added EXIFEDIT utility, which adds and removes EXIF fields.

EXIFLIST
1. Now supports text fields up to 200 characters long (previously truncated text fields to 52 characters).
2. Added support for ASCII User Comment fields (previously the User Comment was displayed as an unformatted hexadecimal string).

3. Added support for the following new fields:
    a. sub-time
    b. sub-time-orig
    c. sub-time-digi
    d. cfa-pattern
4. Added support for the Maker Note field for the following cameras:
    a. Olympus D-450Z and C-920Z
    b. Nikon E700, E800, E900, E900S, E910, E950
    c. Casio QV-2000UX and QV-8000SX

Note that the meaning of some fields is now known. For these fields the value is display in raw format (see /u option on EXIFLIST command).

10.13 Version 1.1.1

No functional changes. Source code changed so that the Windows version will compile using Visual C++ V6.0 (previously Windows version was built using GCC).

10.14 Version 1.1

GENERAL
1. Added EXIFCOPY utility, which copies EXIF data from one JPEG file to another.
2. Fixed bug in JPEG/EXIF file decoding routines, which could have caused buffer overruns

EXIFLIST
1. Add "/f @file-name" option, which allows the list of display fields to be read from a text file. This is used to avoid command line length limitations, which occur when large numbers of fields are specified.
2. Added definitions for additional Interoperability field, and
3. changed the following field nicknames:
4. r98-index -> iop-index
5. r98-ver   -> iop-ver

10.15 Version 1.0

EXIFDATE
Fix bug which caused exifdate to incorrectly change date fields in JPEG files that have been manipulated with 'JPEG Wizard', 'ThumbsPlus', 'ACDsee', and any other image manipulation utilities that do not save the EXIF Marker as the first marker in the file.

10.16 Version 0.5

GENERAL
1. Fix field value display routines to remove redundant blank that was present after some values
2. Fix bug in JPEG file decode routines, which did not correctly handle very short files.
3. Improve robustness of EXIF decode routines so that they are more tolerant of badly formatted EXIF fields.
4. Tidied up sources to be more compatible with VC++ (renamed ERROR #define to EXIF_ERR, and renamed WINDOWS #define to WIN32)

EXIFLIST
1. Added /f option to allow user to select which fields get displayed in list mode and sql mode.

2. Added file size (in bytes) as a field value that can be displayed in list mode and sql modes.
3. Add '/o lh' option to allow the user to select whether a heading row is printed in list mode ('/o lh' is equivalent to '/o l' in V0.4)
4. Add /l option to provide list of valid field names that can be specified in the /f option.
5. Added /v option to show program version information

EXIFDATE
1. Added /v option to show program version information

10.17 Version 0.4

Fix bug which caused EXIFLIST to erroneously report that there was no EXIF data in a JPEG file. This occurred when the image had been manipulated with 'JPEG Wizard', 'ThumbsPlus', or any other image manipulation utility that did no save the EXIF Marker as the first marker in the file.

10.18 Version 0.3

GENERAL
1. the exifdate utility has been added.

EXIFLIST
1. the option to output EXIF fields as an SQL INSERT statement
2. some command options have been changed to be more extensible, and be more consistent with UNIX conventions:
    a. the '/l' option has been changed to '/o l'
    b. the '/s' option has been changed to '/r'
    c. the '/r' option has been changed to '/u'

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