

SER format description

Overview

Ser format consist of three parts:

- ❖ Header
with fixed size of 178 Byte
- ❖ Image frame data
with variable byte size of:
<Pixeldepth (2Byte or 1Byte)> x <Image width> x <Image height> x <Total amount of Images>
- ❖ Trailer
Optional. Byte size of 8 x <Total amount of Images>

Header

1_FileID

Format: String
Length: 14 Byte (14 characters)
Content: "LUCAM-RECORDER"

2_LuID

Format: Integer_32
Length: 4 Byte
Content: Lumenera camera series ID

3_ColorID

Format: Integer_32
Length: 4 Byte
Content: MONO = 0
BAYER_RGGB = 8
BAYER_GRBG = 9
BAYER_GBRG = 10
BAYER_BGGR = 11
BAYER_CYYM = 16
BAYER_YCMY = 17
BAYER_YMCY = 18
BAYER_MYYC = 19

4 LittleEndian

Format: Integer_32
Length: 4 Byte
Content: 0 for Big endian byte order in 16Bit pixel format
1 for Little endian byte order in 16Bit pixel format

5 ImageWidth

Format: Integer_32
Length: 4 Byte
Content: Width of every image in pixel

6 ImageHeight

Format: Integer_32
Length: 4 Byte
Content: Height of every image in pixel

7 PixelDepth

Format: Integer_32
Length: 4 Byte
Content: True bit depth of an pixel
If PixelDepth <= 8: One pixel is stored in one Byte: BytePerPixel=1
If PixelDepth > 8: One pixel is stored in two Byte: BytePerPixel=2

8 FrameCount

Format: Integer_32
Length: 4 Byte
Content: Amount of image frames in SER file

9 Observer

Format: String
Length: 40 Byte (40 characters)
Content: Name of observer

10 Instrume

Format: String
Length: 40 Byte (40 characters)
Content: Name of used camera

11 Telescope

Format: String
Length: 40 Byte (40 characters)
Content: Name of used telescope

12 DateTime

Format: Date

Length: 8 Byte

Content: Start time of image stream

- ❖ If value = MinValue Then no Time data were stored

- ❖ If value = MinValue then SER file does not contain a Time stamp trailer

13 DateTime UTC

Format: Date

Length: 8 Byte

Content: Start time of image stream in UTC

Image Data

Image data starts at File start offset decimal 178

Size of every image frame in byte is: 5_ImageWidth x 6_ImageHeigth x BytePerPixel

Trailer in detail

Trailer starts at byte offest: 8_FrameCount x 5_ImageWidth x 6_ImageHeigth x BytePerPixel

Trailer contains 8Byte time stamps for every image frame

According to Microsoft documentation the used time stamp has the following format:

“Holds IEEE 64-bit (8-byte) values that represent dates ranging from January 1 of the year 0001 through December 31 of the year 9999, and times from 12:00:00 AM (midnight) through 11:59:59.9999999 PM. Each increment represents 100 nanoseconds of elapsed time since the beginning of January 1 of the year 1 in the Gregorian calendar. The maximum value represents 100 nanoseconds before the beginning of January 1 of the year 10000.”

According to the findings of Raoul Behrend, Université de Genève, the date record is not a 64 bits unsigned integer as stated, but a 62 bits unsigned integer. He got no information about the use of the two MSB.