

# Description of hyperspectral file format

This document contains a short description of the default file format that Prediktera Evince and Breeze software use to save and load hyper/multi-spectral data cubes.

The format has its origin from a format called envi, but only a part of that format is required.

The format consists of two files. One header file with the extension **.hdr** and one binary file with the extension **.raw**. For example: measurement.hdr and measurement.raw.

## Header file specification

The required parts that must be in the header file is specified below:

- description
  - Description of the header file
- file type
  - Should always be ENVI
- interleave
  - Refers to whether the data are BSQ, BIP, or **BIL (default)**
- samples
  - The number of samples (pixels) per image line for each band
- lines
  - The number of lines per image for each band
- bands
  - The number of bands per image file.
- default bands
  - Red, Green and Blue default bands for visualisations
- data type
  - The type of data representation:
    - 1 8-bit byte
    - 2 16-bit
    - 3 32-bit signed long integer
    - 4 32-bit floating point
    - 5 64-bit double-precision floating point
    - 6 2x32-bit complex, real-imaginary pair of double precision
    - 9 2x64-bit double-precision complex, real-imaginary pair of double precision;
    - 12 16-bit unsigned integer; 13=32-bit unsigned long integer;
    - 14 64-bit signed long integer; and 15=64-bit unsigned long integer.
- byte order

- The order of the bytes in integer, long integer, 64-bit integer, unsigned 64-bit integer, floating point, double precision, and complex data types. Use one of the following:
  - **Byte order=0** (Host (Intel) in the Header Info dialog) is least significant byte first (LSF) data (DEC and MS-DOS systems).
  - **Byte order=1** (Network (IEEE) in the Header Info dialog) is most significant byte first (MSF) data (all other platforms).
- Wavelength
  - Lists the center wavelength values of each band in an image.

## Example of header file

```
ENVI
description = { Created by Breeze }
file type = ENVI

interleave = BIL
samples = 320
lines    = 500
bands    = 256
default bands = {64, 128, 192}
data type = 12
byte order = 0

Wavelength = {
1061.5,
1083.8,
1106.1,
.
.
.
2488.7,
2511.0,
2533.3
}
```

## Binary file specification

The binary file format is written using one of the data types specified in the header file. How the data is stored is depending on the interleave flag. Prediktera uses the interleave BIL as default which stores one frame (samples \* bands) after each other (lines).