Profile Format

PTLens examines file **profile.txt** for a list of profile filenames. For the standalone version this file, and all related profiles, must be placed in the PTLens installation directory. Requirements are less stringent for the plugin version as it queries for the location of file **profile.txt** the first time it runs. Both versions can share the same set of profiles.

The following snippet illustrates the configuration for the 17-40mm Canon lens two associated cameras.

```
begin lens
group: canonSLR
multiplier: 1.0
menu_lens: EF 17-40mm f/4L USM
cal_abc: 17     0.000000  0.021537 -0.081678
cal_abc: 19     0.000000  0.019287 -0.073180
cal_abc: 21     0.000000  0.017823 -0.063440
cal_abc: 23     0.000000  0.023297 -0.064245
cal_abc: 25     0.000000  0.020031 -0.048520
cal_abc: 30     0.000000  0.019298 -0.049148
cal_abc: 33     0.000000  0.011909 -0.024531
cal_abc: 36     0.000000  0.016812 -0.030399
cal_abc: 40     0.000000  0.014138 -0.029191
end

begin camera
group: canonSLR
group: genericSLR
multiplier: 1.0
menu_make: Canon SLR
menu_model: 1Ds
exif_make: Canon
exif_model: Canon EOS-1DS
end

begin camera
group: canonSLR
group: genericSLR
multiplier: 1.3
menu_make: Canon SLR
menu_model: 1D Mark II
exif_make: Canon
exif_model: Canon EOS-1D Mark II
end
```

Each lens belongs to a single **group**. Each camera imports one or more groups. Currently there are 15 lenses in the canonSLR group. The genericSLR group includes 3rd party lenses such as the Sigma 15mm fisheye.

Entries **menu_make** and **menu_model** describe the text that appears in the PTLens menus. Entries **exif_make** and **exif_model** must correspond the EXIF information embedded in the image. Entry **menu_lens** describes the lens. Specify Standard for cameras with non-interchangeable lenses. The **cal_abc** entries specify focal length followed by the Panorama Tools **a**, **b**, and **c** coefficients. Coefficient **d** is calculated as

$$d = 1.0 - (a + b + c)$$

The **multiplier** is determined as follows:

```
multiplier = (diagonal of 35mm frame) / (diagonal of sensor)
```

Obtaining exact values is not critical for distortion correction of individual images. Approximate values are listed below:

Type	Diagonal(mm)	Multiplier
1/3.6"	5.000	8.653
1/3.2"	5.680	7.617
1/3"	6.000	7.211
1/2.7"	6.592	6.563
1/2.5"	7.042	6.144
1/2"	8.000	5.408
1/1.8"	8.933	4.843
1/1.7"	9.648	4.487
2/3"	11.000	3.933
1"	16.000	2.704
4/3"	22.500	1.923
35mm frame	43.267	1.000

Both camera and lens definitions specify a multiplier. The camera multplier is based on sensor size. The lens multiplier indicates the multiplier of the camera used at time of calibration. Specifying a group in the camera definition selects all lenses in that group eligible for that camera. To be eligible the lens must have a multiplier less than or equal to the camera's multiplier. This means that a calibration done for a specific lens on a large sensor camera can be applied to another camera with a smaller sensor. This is done automatically by PTLens. Recall the equation for radial correction:

$$R_s = a \cdot {R_d}^4 + b \cdot {R_d}^3 + c \cdot {R_d}^2 + d \cdot R_d$$

We must shrink R_s and R_d by a constant factor to compensate for cropping done by smaller sensors. e.g.,

$$k \cdot R_s = a \cdot (k \cdot R_d)^4 + b \cdot (k \cdot R_d)^3 + c \cdot (k \cdot R_d)^2 + d \cdot k \cdot R_d$$

Rewriting we have

$$R_s = a \cdot k^3 \cdot {R_d}^4 + b \cdot k^2 \cdot {R_d}^3 + c \cdot k \cdot {R_d}^2 + d \cdot R_d$$

As a practical example, the coefficients at 17mm for the above lens at a multiplier of 1.0 are

```
a =  0.000000
b =  0.021537
c = -0.081678
```

Adjusting them for a camera with a multplier of 1.3, or k = 1.0/1.3, yields

```
a' = a * (1.0/1.3)**3 =  0.000000
b' = b * (1.0/1.3)**2 =  0.012744
c' = c * (1.0/1.3)    = -0.062829
```

Camera makes are listed alphabetically. Cameras models and lenses are listed in the order they appear in the calibration file. If adjacent lenses in the profile have the same description, then the lens with the largest multiplier that is less than or equal to the camera's multiplier is chosen. For example, if calibrations are done at multipliers of 1.0, 1.3, and 1.6, and an image is taken by a camera with a multiplier of 1.5, then coefficients from the 1.3 image are adjusted and utilized.

If you incorporate a wide angle or telephoto converter, then specify a converter factor:

```
begin lens
group: nikon5700
multiplier: 3.933
menu_lens: TC-E15ED (full zoom)
converter_factor: 1.5
converter_detected: 0
cal_abc:   71.2   -0.000659  0.004458  0.000000
end
```

This is the 1.5x telephoto converter applied to the Nikon CP5700 camera. The "full zoom" comment was added, as the configuration is currently calibrated at one point: full telephoto zoom. You can add any comment you wish, and it will appear in the Lens menu. The **converter_detected** field indicates whether or not the camera used for making the profile altered EXIF focal length based on the converter factor. That is, if converter_detected is true (1), focal lengths in the **cal_abc** fields include the converter factor.

References

Panorama Tools is on the web at www.fh-furtwangen.de/~dersch, or mirror site www.path.unimelb.edu.au/~dersch.