

1. File formats

The default excitation signal is a pulse with variable bandwidth. From version 4.0.130 on, the code provides additional choices, such as a number of signals used in pulse compression techniques. More importantly, it is possible to inject a user-defined signal, which can optionally be time-reversed.

The user-defined signal uses the same formats used for A-Scans and B-Scans. The A-Scan format is recommended for setups where all transducer elements use the same excitation signal. The B-Scan format must be used in phased array setups where each transducer element requires an individual signal, as would be the case with time reversal applications. Note that the current version does not yet support this and will use the first line of the B-Scan file for all transducer elements.

The A-Scan file format uses a two line header, followed by the samples amplitude data. The first header line is used to identify the file and must begin with “#Milena A-Scan”. The second line contains the number of samples, the time step in seconds, a delay value (always ignored), and the sampling frequency in MHz. Note that time step and sampling frequency are in principle redundant; however, due to possible rounding errors in the ASCII representation, both are provided. When using A-Scan files to define an excitation signal, time step and sampling frequency are ignored.

```
#Milena A-Scan result file          Version 2.0
512 8.474576e-008 0.000000 11.800000
0.
0.000000e+000
1.162737e-007
-2.135055e-009
-1.393242e-006
-4.752166e-006
```

Figure 8: A-Scan file header (and six lines of data)

The B-Scan file format uses three header lines. Again, the first line is used to identify the format and must begin with ‘#BSCAN’. The second line contains the number of A-Scans, the number of samples per A-Scan, and the number of B-Scans (always 1). The third line contains the spatial resolution in x and y direction and the time step in μ s, all of which are ignored when B-Scan files are used to define excitation signals.

```
#BSCAN format 2D
80 2000 1
1.000000 1.000000 0.015020
0
0
```

Figure 9: B-Scan file header (and two lines of data)