Appendix 1 – Detailed description of RD3, RD7 and RAD formats

A MALÅ GPR data set always consists of (at least) two files: one header file (*.rad) that contains information about data collection settings and one data file (*.rd3 or *.rd7)

*.rd7 containing raw data (4 bytes/sample) in straight binary format
*.rd3 containing raw data (2 bytes/sample) in straight binary format
*.rad header file containing parameters and other information connected to the data in the *.rd3/rd7 file

The *.rd3 and *.rd7 files

In the *.rd3 file data is stored as signed 16 bit signed integers (short int) in a binary file. The traces are stored sequentially. The *.rd7 file has the same structure only the data values are stored as 32 bit signed integers (int).

Below you'll find an example written in C-code, assuming the file is open. The parameter "tracenumber" points out the actual trace number to read and the parameter "buffer" should point to an array of short (rd3) or int (rd7), large enough for the trace.

```
void readtrace_rd3( FILE  *fp, long tracenumber, short *buffer, int samples) {
   long pos;
   int nbytes;
   pos = samples;
   pos *= sizeof(short);
   pos *= tracenumber;   // position of targeted trace calculated

   if (fseek(fp,pos,SEEK_SET)!= 0) {
      error(ERR1);      // check if it works abort otherwise!
   }
   nbytes = samples * sizeof(int);
   if ( fread((char *)buffer,1,nbytes,fp) !=nbytes) {  // read the trace into the
buffer
      error(ERR2);                              // abort if something went wrong
   }
}

void readtrace_rd7( FILE  *fp, long tracenumber, int *buffer, int samples) {
   long pos;
   int nbytes;
   pos = samples;
   pos *= sizeof(int);
   pos *= tracenumber;   // position of targeted trace calculated

   if (fseek(fp,pos,SEEK_SET)!= 0) {
      error(ERR1);      // check if it works abort otherwise!
   }
   nbytes = samples * sizeof(int);
   if ( fread((char *)buffer,1,nbytes,fp) !=nbytes) {  // read the trace into the
buffer
      error(ERR2);                              // abort if something went wrong
   }
}
```

This example showz how to read one trace at a time even though the file format actually lends itself to much faster reads, in large chunks.

The *.rad file

This file is a formatted text file.
The important parameters are:
SAMPLES – the number of samples in one trace
FREQUENCY – the sampling frequency used
DISTANCE/TIME/PROGRAM/EXTERNAL FLAG – which trig source was used
TIME INTERVAL – time between traces if time triggering was selected
DISTANCE INTERVAL – distance between traces if distance triggering was selected
TIME WINDOW – length of time window
STACKS - how many observations were averaged to create one sample
LAST TRACE – the number of traces in the rd3/rd7 file
STOP POSITION – distance or time of last recorded trace