SON file versions

This manual describes version 9 of the SON filing system. The library functions will read files produced by all previous versions, files created or updated by the version 9 library have version numbers as low as possible depending upon the library features used. Previous versions of the library will not read files with a higher library version. The major changes between revisions are:

Version 1 The original SON filing system, in Pascal, supported waveform and `Event` data only.

Version 2 New `Marker` data type. Extra space was added to the file header for future expansion. The version 2 library was much faster dealing with large data files as it remembered the last access point for each file during reading.

Version 3 The `FilterMarker` function was added with this version and the meaning of the divide element of the channel record for waveform data was changed to prevent an apparent change of sampling rate if a waveform channel was added or deleted.

Version 4 The `AdcMark` data type was added, the use of `FilterMarker` was changed and the library now remembers the data block currently in the data buffer to avoid reading the disk when the required block is already in memory.

Version 5 The `TextMark` and `RealMark` data types and the `MaxTime` and `ChanMaxTime` functions were added. Versions were also written in C for both the IBM PC in DOS and under Windows and for the Macintosh. The version 5 libraries write version 3 and 4 files as appropriate to prevent unnecessary conflict between library versions.

In 1998, the C version of the library was extended to cope with read-only files by adding `iMode` to `SONOpenOldFile` and the `SONCanWrite` function was added. The return type and `max` argument of the `SONWriteXXXXData` routines were changed from `WORD` to `long`. Added lookup tables into the file to speed up data access in long files and to provide write buffering. Write buffering removes the need for `FastWrite` mode, allows peri-triggered sampling, optimises use of disk space and speeds up writing data to disk. The file commit mechanisms were improved.

Version 6 This version of the library is documented for C/C++ use only, with information on how it can be used as a DLL by other languages. The `RealWave` channel type is added, `AdcMark` channels are allowed to have multiple channels, waveform sample rates are set by `lChanDvd` and the previous `v.adc.divide` now sets the interleave for `AdcMark` data. We have added support for a file time and date stamp, a file basic time unit and support for an application identifier. Files will still be written to be compatible with versions 3, 4 or 5 if they do not use version 6 features. The API was maintained, but some argument types changed: `TDataKind` is an enumerated type and buffer sizes are `long` not `WORD`.

Version 7 You can choose to round the sizes of `AdcMark` and `TextMark` extended marker types up to a multiple of 4 bytes so that we can build the library on systems that insist on aligned data access. See the new `SONExtMarkAlign()` function.

Version 8 Altered storage of channel numbers so that we avoid the bit used to hold the initial state for a level channel, plus extended the maximum number of channels possible to 451. Extended the lookup table system so that the table for a channel starts small and grows up to the limit (larger than the fixed size used previously).

Version 9 Added support for big files (up to 512 GB), rewrote the internal lookup table system to improve speed and now saves the table as part of the file in Big file mode. Support for the Macintosh was removed. Linux support is added. In a version 9 file, all pointers to disk space that were previously byte pointers (but multiples of 512) are now used as block pointers. That is, a pointer value 10 means byte 5120 in the file. This allows us to increase the maximum file size by a factor of 512. There are changes to the file header to support a lookup table on disk and to channel headers to track the block counts.