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Avatar EEG Data Formats

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Note: Big endian (network) byte order is used in both the data file and data frame formats.

Data File Format

If microSDHC is present and `write_to_sd = 1`, then data will be recorded to a binary file on the microSDHC card. The file consists of timing structures interleaved by 511 data structures. e.g. The timing structure is the first 24 bytes of the file and the next 12264 bytes consists of 511 data structures followed by another timing structure and so on. The data structure consists of the raw 24 bit values sampled from the ADC (Analog to Digital converter). The structure formats are as follows:

Timing Structure	Size (Bytes)	
SOC	4	Seconds since Jan 1, 1970
Counter	4	32768Hz counter
Frame Count	4	Increments after 384 bytes saved
Reservered	12	For future use
Total	**24**	

Data Structure	Size (Bytes)	
Channel 1	3	Raw sample from ADC in big endian (network) byte order
Channel 2	3	
Channel 3	3	
Channel 4	3	
Channel 5	3	
Channel 6	3	
Channel 7	3	
Channel 8	3	
Total	**24**	

For performance, data is written to the file in 3072 byte chunks. Therefore data file length should always be a multiple of 3072 bytes. Ensure to press the button on the Avatar EEG recorder to ensure proper closing of the file to avoid FAT file system corruption.

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Data Frame Format (transmitted via Bluetooth)

If a Bluetooth serial port profile (SPP) connection is made to the Avatar EEG recorder, then data will be streamed out continuously. The format of the data streamed out is as follows:

Data Frame Field	Size (Bytes)	Value : Description
Sync	1	0xAA
Version	1	1 : Version number of protocol
Framesize	2	384 (typical) : Number of bytes in frame
Frame Type	1	1 : data frame
Frame Count*	4	Increments with each frame available to be transmitted
Channels	1	8
Samples	2	16 : Samples in this frame
Data	384	Data values and timing frames 16*8x3 = 384 bytes
Total	**396**	Frame size should equal this value

* When the high bit is set in the Frame Count it indicates the first 24 bytes of the Data field is a timing structure.

As with the file format, a timing structure is embedded within the data field before every 511 data structures.

For an Avatar EEG recorder with eight channels at 500 samples per second and 24bit configuration, 12000 bytes/second of ADC data is transmitted. When the timing structures are inserted this corresponds to (12288-24)/12000)*12288/384 = 31.31 frames per second will be transmitted.

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