Table Ordering Conventions

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Version 3:   remove "structure" and "data structure" used as prefixes to "element" because "element" is defined.

Version 2:   Change"tabular definition..." to "table" and changed "abstract ordering" to "ordering".

Version 1:   Changes as directed by Style Guide teleconference 27 October 2005.

1 Issue

The subclause that describes the convention for bit and byte ordering has led some to believe it constrains storage of data in memory or storage of data in devices or transmission of data on communication media. It is my belief that the only valid purpose for this subclause is to define the conventions for establishing an abstract ordering (e.g., MSB and LSB, first byte and last byte) of the data presented in a data structure table, since ordering of data storage and transmission may vary from standard to standard or even for different applications within a standard. If needed, other parts of the normative text of a standard should map this abstract ordering to transmission ordering or storage ordering.

2 Proposal

A broad restatement of the subclause that describes the convention for bit and byte ordering is proposed below.

3 Instructions to editor

3.1 Conventions

This proposal references 05-085r4 for numbers of clauses, subclauses, tables, figures, etc. Deletions are denoted by ~~red strikeout text~~. Additions are denoted by blue text.

3.2 Changes to 05-085r4

Modify body of subclause 3.7 up to the leadin paragraph for tables 3 and 4 :

In this standard, data structures may be defined by a table. A table defines a complete ordering of elements (i.e., bits, bytes, fields, and dwords) within the structure. The ordering of elements within a table does not in itself constrain the order of storage or transmission of the data structure, but in combination with other normative text in this standard, may constrain the order of storage or transmission of the structure.

In a table, any element that is presented in a row above another element in a lower row is more significant than the lower element, and any element presented to the left of another element in the same row is more significant than the element to the right.

If a table shows bit numbering (see table 3), the least significant bit (LSB) is numbered 0 and each more significant bit has the next greater number than the immediately less significant bit. If a table shows numbering of bytes or characters (see table 4), the most significant byte or character is represented at the lowest number and each less significant byte or character has the next greater number than the immediately more significant byte.

In a field in a table consisting of more than one bit that contains a single value (e.g., a number), the least significant bit (LSB) is shown on the right and the most significant bit (MSB) is shown on the left (e.g., in a byte, bit 7 is the MSB and is shown on the left, bit 0 is the LSB and is shown on the right). The MSB and LSB are not labeled if the field consists of ~~8~~ eight or fewer bits. The MSB and LSB are labeled if the field consists of more than eight bits and has no internal structure defined.

~~In a field in a table consisting of more than one byte that contains a single value (e.g., a number), the byte containing the MSB is stored at the lowest address and the byte containing the LSB is stored at the highest address (i.e., big endian byte ordering). The MSB and LSB are labeled.~~

In a field in a table consisting of more than one byte that contains multiple fields each with their own values (e.g., a descriptor), there is no MSB and LSB of the field itself and thus there are no MSB and LSB labels. Each individual field has an MSB and LSB, but they are not labeled.

In a field containing a text string (e.g., ASCII or UTF-8), only ~~the MSB label is~~ the MSB of the first character and ~~the LSB label is~~ the LSB of the last character are labeled.

Multiple byte fields are represented with only two rows, with the non-sequentially increasing byte number ~~indicating~~ denoting the presence of additional bytes.