

# FrameMaker® templates for writing IEEE specifications

**Draft 0.55**

Sponsor:  
**Possibly the IEEE Computer Society**

**Abstract:** This standard defines templates that shall be used for IEEE Standards.  
**Keywords:** Style, formatting, template

## **Background**

This manual describes the use of document templates developed by for use when writing IEEE drafts. This document is preliminary and subject to change.

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**Resolved topics:**

Resolved topics, for which further discussion may be unnecessary, include the following items:

- a) Lists. How should list initialization be performed? Are List1First, List2First, List3First needed?  
**Status:** 2003Mar26.
  - 1) Body, List1/List1First, List2/List2First initialize counts for List1, List2, and List3.  
(in this sense, List1First, List2First, and List3First are unnecessary).
  - 2) The List1First, List2First, and List3First styles are needed, to handle unusual cases where the preceding auto-initialize text is not available.
- b) Initializing. Can we safely eliminate initializing *FigureTitleAFirst* & *TableTitleAFirst* styles?  
**Status:** 2003Mar26. Yes. The clause and annex numbering can do this automatically.
- c) When should figure/table/equation counts be restarted?  
**Status:** 2003Mar26. Either of the following options to be supported:
  - 1) Reset at the start of each clause and at the start of each annex.
  - 2) Reset at the start of the 1st clause and at the start of each annex.
 \*\*However, techniques for supporting both options are TBD.
- d) Figures. Styles and conventions for FrameMaker graphics.
  - 1) Snap grid. For Frame graphics, the default snap grid of 9 points is too coarse.  
**Status:** 2003Mar26. The default snap-grid will be 3 points.  
However, groups may elect to use other snap-grid sizes.
  - 2) What paragraph styles should be used for textual callouts?  
**Status:** 2003Mar26. The following defaults to be supported, but not mandated:  
*FigureText*—Left justified Helvetica 8-point font.  
*FigureTextCenter*—Centered Helvetica 8-point font.  
*FigureTextRight*—Right justified Helvetica 8-point font.  
Note that these conventions are helpful, but need not be mandated.
- e) Tables. What styles should be used within tables?  
**Status:** 2003Mar26.  
*TableCell*—Left-justified table entry (9-point font).  
*TableCellLeft*—Left-justified table entry (9-point font).  
*TableCellRow*—Centered table-row count entry (9-point font).
- f) Table Row. How should a *Row* cross-references be formatted?  
**Status:** 2003Mar26. *Row 3.5-1*.
- g) C-code fragments. What styles should be used for C-code fragments?  
**Status:** 2003Mar26.  
Delete the table format, which has page-crossing problems.  
Use a distinct style for equations and C code fragments.  
Support single-line and multi-line C-code fragments.

## Unresolved topics:

Topics believed to require further discussion include the following items:

- a) Naming. How can we migrate to intuitive&consistent style names?  
**Status:** Deferred 2003Mar26. This will be resolved after functionality is better known.
- b) Body vs T,Text: See if that change is compatible with the conversion process  
**Status:** Deferred 2003Mar26. This could be affected by general naming decision, listed above.
- c) Table cell shading: Can table cells be shaded, to illustrate lower-relevance of reserved lines?  
**Status:** Deferred 2003Mar26. Michel to evaluate further.
- d) Table cell references: Can the proposed table-row cross reference be supported?  
**Status:** Deferred 2003Mar26. IEEE&Michel to evaluate further.
- e) Figures as tables: Can the figures be implemented as tables? Are multicell tables OK?  
This avoids FrameMaker figure-flow bugs, auto-centers the figure, and automates title placement.  
**Status:** Deferred 2003Mar26. IEEE&Michel to evaluate further.
- f) Code fragments: Should code fragments be called tables, figures, or code?  
**Status:** Deferred 2003Mar26. Everyone to contemplate further.
- g) TableCell formats. Two options for table-cell formats should be considered.  
**Status:** Deferred 2003Mar26. Unclear. *FigureCell* is left-justified, but most table cells are centered.
  - 1) *TableCell* and *TableCellLeft*, since table-cell fields should be centered by default.
  - 2) *TableCellLeft* and *TableCell*, since defaults should correspond to descriptive text.
- h) C-code fragments. Should C-code fragments be treated as tables, figures, or code?  
This affects which numbering style would be used, so tables or figures are preferred (otherwise, the levels of supported headings would be reduced from six-to-five).
- i) Reference umbering conventions (allowances for many references).  
[R9] for reference 9, due to large number (~100) of references.  
**Status:** Tentative 2003Mar26.  
The IEEE to make this request when harmonizing with ISO/IEC.  
ISO/IEC rules will be obeyed, and they currently cite the standard number.  
RPR to be reminded that useful background is a bibliography, not reference item.  
Distinct styles to be provided for references, so that they can be numbered (or not) as needed.
- j) What styles are necessary to properly mark the cover pages for IEEE conversions?  
**Status:** Tentative 2003Mar26. Michel to identify which text needs specific style names.

## Topics for discussion:

Topics which are known to require further clarification in this document include the following items:

- a) Definitions of *shall*, *should*, *may*, *expected*.  
How are these to be defined and/or cross-referenced.
- b) Figures. How should abbreviations be listed within the figure (when necessary).  
(see proposal D.1.5).
- c) Numbering conventions (allowances for large drafts).
  - 1) Page 1 for the first page within the draft, to reduce printing *surprises*.
  - 2) Titles formats:
    - i) Figure 3-5—Initialization sequences (defficient).
    - ii) Figure 3.5—Initialization sequences (desired).
  - 3) Figure 3.7, Table 3.7, Equation 3.7, for the 7th figure, table, equation within clause 3.
  - 4) Row 3.7-6, for the 6th row within Figure 3.7.
- d) Conventions.
  - 1) Don't use 3 periods to emulate elipsis (it becomes hard to search for duplicate period errors).
  - 2) Style. Conventions for fields and enumerated values:
    - i) The 2-bit *serviceClass* field values of ... .
    - ii) The *serviceClass* equals the CLASS\_C value ... .
  - 3) Headings. Cross-reference names within StdBody reference page, which references page #1.
- e) Procedure. How do we progress in the following areas?
  - 1) Scope. Which portions are appropriate for IEEE, 802, and 802.17?
  - 2) Word. After convergence, equivalent Word template should become available.
  - 3) Review. How should these styles receive a wide review?
  - 4) Open. How can we encourage broad usage throughout organizations?
  - 5) Useful. The style specification should be a properly styled document!
- f) Cross references. Two options for *Figure 5.5* cross references should be considered:
  - 1) The *Figure* name is text and only the numerical 5.5 cross reference is used.
  - 2) The cross-reference format yields the name *Figure 5.5*, with appropriate nonbreaking space.

## Change summary

Topics which are known to require further clarification in this document include the following items:

- a) 2003Mar26. Incorporation of ad-hoc subcommittee, including IEEE editors.  
Next review meeting planned for 3-5 weeks, depending on Roger Marks availability.
- b) 2003Mar19. Update for review by ad-hoc styles subcommittee, including IEEE editors.
- c) 2002Aug17. Completion of massive rewrite, including (but not limited to):
  - 1) Convergence of Word and FrameMaker Templates.
  - 2) Six-level indent. This was provided for those that extend beyond the normal five-level indent.  
Further indents were not possible, due to use of number styles on figures, tables, and equations.

## Contents

1.	Overview .....	13
1.1	Scope and purpose .....	13
1.2	Template motivation .....	14
1.2.1	Services to the editor.....	14
1.3	Standard clauses.....	14
1.4	Book contents .....	14
1.5	Document structure.....	15
1.5.1	Page numbering .....	15
1.5.2	Table of contents (TOC).....	15
1.5.3	List of figures and tables.....	15
1.5.4	Figure and equation numbering .....	15
1.6	Basic writing conventions.....	15
2.	References.....	16
3.	Terms and definitions .....	17
3.2	Glossary of terms .....	17
3.4	Acronyms and abbreviations .....	18
3.5	C-code notation.....	21
3.6	State machines .....	22
4.	Using the templates.....	23
4.1	Company document numbers .....	23
4.2	Document variables .....	23
4.3	Paragraph styles .....	24
4.4	Cross-reference styles .....	27
5.	Clause and subclause headings .....	28
5.1	Subclause-2 heading .....	28
5.1.1	Subclause-3 heading .....	28
5.1.1.1	Subclause-4 heading.....	28
6.	Definitions .....	29
6.3	Leading second-level indent .....	29
6.3.1	Leading third-level heading .....	29
6.3.1.1	Leading fourth-level heading .....	29
6.3.1.2	Definition5 heading.....	29
6.3.2	Definition4 heading .....	29
6.4	Definition3 headings.....	30
7.	Text formatting .....	31
7.1	Editor notes .....	31
7.2	Informative notes .....	31
7.3	Body styles.....	31
7.4	Page breaks .....	32
7.5	Lists.....	32

7.5.1	Numbered lists .....	32
7.5.2	Dashed lists .....	32
7.6	Tables .....	33
7.7	Native FrameMaker figures .....	34
7.7.1	Figure creation .....	34
7.7.2	Snap grid usage .....	34
7.7.3	Maintaining the snap grid .....	35
7.7.4	Flow-chart styles .....	35
7.7.5	Multicell figures .....	36
7.8	Equations .....	36
7.9	Computer code .....	37
7.9.1	Short in-line C code .....	37
7.9.2	Lengthy C code .....	37
7.10	Title styles .....	37
7.11	Cross references .....	37
7.12	Autonumbered styles .....	38
8.	Special pages .....	39
8.1	Master pages .....	39
8.2	Reference pages .....	39

## Annexes

Annex A (informative)	Bibliography .....	40
A.1	Bibliography references .....	41
A.2	Grammar references .....	41
Annex B (normative)	Annex styles .....	42
B.1	Annex headings .....	42
B.2	Subannex-2 heading .....	42
B.2.1	Subannex-3 heading .....	42
B.2.1.1	Subannex-4 heading .....	42
B.3	Other annex styles .....	43
B.3.1	Annex figures .....	43
B.3.2	Annex tables .....	44
B.3.3	Annex equations .....	44
B.4	Computer code .....	44
B.4.1	Short in-line C code .....	44
Annex C (informative)	Common grammatical issues .....	45
C.1	Use of the word "the" .....	45
C.2	Use of the word "a" or "an" .....	46
C.3	Numbers: numerical or alphabetical? .....	46
C.4	That and which .....	46
C.5	Gender-Neutral language .....	47
C.6	Use of the second-person form of address .....	47
C.7	Table cell justification .....	47

Annex D (informative)FrameMaker guidelines .....	48
D.1 Field formats within figures.....	48
D.1.1 Frame format illustrations.....	48
D.1.2 Generic field illustrations.....	49
D.1.3 8-bit field format.....	49
D.1.4 16-bit field formats .....	49
D.1.5 32-bit field formats .....	50
D.2 Managing deprecated styles.....	51
D.2.1 Converting deprecated styles .....	51
D.2.2 Deleting deprecated styles .....	52
Annex E (informative)Using FrameMaker.....	53
E.1 Special mathematical symbols.....	53
E.2 Windows special characters.....	54
E.3 MacIntosh special characters .....	55
Annex F (informative)IEEE specifics .....	56
F.1 Common references .....	56
F.2 IEEE cover pages.....	58
Annex G (informative)C-code illustrations.....	63

## Figures

Figure 3.1—Expanded bit-field descriptions .....	19
Figure 3.2—Frame contents .....	20
Figure 3.3—Flow-control sendA generation.....	22
Figure 7.1—Quadlet register illustrations .....	34
Figure 7.2—FrameMaker expansion and contraction restrictions .....	35
Figure 7.3—Flow-control sendA generation overview .....	35
Figure 7.4—Severed loop discovery .....	36
Figure B.2—Quadlet register illustrations .....	43
Figure D.1—Frame format illustrations .....	48
Figure D.2—Example of a bit-field illustration .....	49
Figure D.3—8-bit field format .....	49
Figure D.4—16-bit field format .....	49
Figure D.5—32-bit field format .....	50
Figure D.6—Converting deprecated styles, phase 1 .....	51
Figure D.7—Converting deprecated styles, phase 2 .....	51
Figure D.8—Deleting deprecated styles, phase 1 .....	52
Figure D.9—Deleting deprecated styles, phase 2 .....	52



## Tables

Table 3.1—Names of command, status, and CSR values .....	19
Table 3.2—C code expressions .....	21
Table 3.3—Flow-control sendA generation .....	22
Table 4.4—Referenced variables .....	23
Table 4.5—Paragraph styles.....	24
Table 4.6—Cross-reference styles.....	27
Table 7.1—An illustrative table .....	33
Table B.1—An illustrative table.....	44
Table C.1—Example table .....	47
Table E.1—Special symbols and operators.....	53
Table E.2—Framemaker/Window’s special characters .....	54
Table E.3—Framemaker/Mac special characters.....	55

# FrameMaker® templates for writing IEEE specifications

## 1. Overview

Every document should start off the overview with a scope and purpose statement. Each should consist of a single paragraph outlining, as clearly as possible, the scope and purpose of the document. These should be viewed as executive summaries. The scope is intended to communicate the range of topics covered in the document; the purpose is intended to describe the reasons for generation of the document.

Thank you for considering or evaluating this proposed FrameMaker Template! You should use this template if you are using FrameMaker6. This template should be used for formatting standards. It does not provide guidance on IEEE style or information on submittal requirements. On all matters of style, please consult the IEEE Standards Style Manual, 2000 Edition, or speak to an IEEE Standards Project Editor.

It is hoped that you find this template easy to use. If you are creating a document in this template you may simply wish to delete the text that is currently in place and replace it with the text of your own document. If you are importing an existing document into this template we hope you find the instructions on how to use these styles are clear and helpful.

Please *do not delete any of the existing formats*, even though you may not use some of the styles contained in this template; you may find the need to use this style in the future. If you find the need to create a new style, please contact this document editor, so that this enhanced capability can be provided for others.

### 1.1 Scope and purpose

This document is intended to assist engineers in the development of standards, with the scope and purpose listed below:

Scope: This document describes the use of standard Microsoft Word1 templates for creating ISO/IEC compatible standards. Company engineering documents may also use these same style guidelines.

Purpose: To provided clarity and consistency of company documentation developed for internal engineering uses, and to facilitate the transfer of such specifications to standards development organizations (SDOs) for the subset of specifications intended to be standardized.

The templates described by this document contain all the formatting necessary for the cover page, table of contents, list of tables, list of figures, main content, and annexes of your document. No index formatting has been provided, since the editors of this document do not ordinarily have the time to create an index.

## 1.2 Template motivation

The intent of this document is to improve productivity by improving the readability of architecture-specification documents. Perceived benefits to the company include (but are not necessarily limited to) the following:

- a) Efficiency. Fewer hours will be consumed communicating necessary information.
- b) Quality. Fewer mistakes will occur due to misinterpreted specifications.
- c) Timeliness. Reviews and product design times will be reduced due to improved efficiency.
- d) Transferable. Company text can be readily copied into IEEE and ISO/IEC standard proposals.
- e) Sustainable. Tracking IEEE and ISO/IEC formats eliminates internal document-style committees.

### 1.2.1 Services to the editor

These templates are intended to provide the editor with the following services:

- a) Autonumbering. All clauses, subclauses, annexes, and subannexes as well as table, figures, equations, and table-row numbers are automatically numbered.
- b) Table of contents. Automatic generation of table of contents, optionally including:
  - 1) List of figures.
  - 2) List of tables.
- c) Commonality. The same look-and-feel templates are available in Word as well as FrameMaker.
- d) Boilerplate. Standard boilerplate as well as terms-and-definition material is provided.

## 1.3 Standard clauses

Document contents are usually constrained by the type of document you are writing, or by documentation standards outlined by whatever agency or office requests or requires your document. However, the structure of a few clauses and annexes that appears in engineering documentation shall take the form as described below.

- Clause 1. Overview shall be the first clause and shall start with scope and purpose subclauses.
- Clause 2. References shall be the second clause, edited as appropriate.
- Clause 3. Definitions and notation shall be the third clause, edited as appropriate.
- Annex A (informative) Bibliography shall appear be in every document.

## 1.4 Book contents

FrameMaker supports the concept of a book, where that *book* coordinates the concatenation of multiple files (called *documents*) into one specification. These templates are structured in this fashion, with multiple files listed below:

- StdBook.book: The book that coordinates the use of other files.
- StdTOC.fm: The front material and table of contents (not necessary for very small specifications).
- StdLOF.fm: The list of figures (optional) for assisting in the review of early drafts.
- StdLOT.fm: The list of tables (optional) for assisting in the review of early drafts.
- StdBody.fm: Primary clauses and annex content.
- StdCode.fm: Landscape format optimized for 132-column code, such as illustrative C code.

## 1.5 Document structure

The conventions for producing IEEE drafts documents is slightly different from the conventions for producing the final drafts, as discussed in the following subclauses. The IEEE editors are expected to modify working group drafts, to change between draft-and-standard conventions and to check for other style inconsistencies in final working group drafts.

### 1.5.1 Page numbering

The front cover starts with page number 1 and that page number is incremented on each page thereafter. For clarity and consistency between document and computer-printing programs, pages are not reset when the first body page is reached.

### 1.5.2 Table of contents (TOC)

The table of contents, includes more than the two subclause levels recommended by some standards. The table-of-content generation also has some undesirable side-effects, in that special font features (such as superscripts) in subclauses are not properly included in the table of contents. Thus, manual editing of the table-of-contents text may be necessary when generating the final draft.

### 1.5.3 List of figures and tables

The list of figures and list of tables are not recommended for use in some standards, but are useful for reviewers of your drafts, and therefore included in this distribution. Depending on your assigned editor and standards group requirements, you may have to remove these from your book before producing your final draft.

### 1.5.4 Figure and equation numbering

Figure, table, and equation numbering. Figures and table number is of the form  $x.y$ , where  $x$  is the clause or annex number and  $y$  is a unique sequential number within that clause or annex. This style is allowed, but not encouraged, by IEEE editors.

## 1.6 Basic writing conventions

Document contents are usually constrained by the type of document you are writing, or by documentation standards outlined by whatever agency or office requests or requires your document. However, the structure of a few clauses and annexes that appears in engineering documentation shall take the form as described below.

- a) Capitalization. Only the first word in any heading is capitalized. This relieves the author of the need to distinguish between short and long words when writing headers.
- b) Naming. All register and field names should be the same, whether described/specified in headers, figures, or explanatory text.
- c) Ellipsis. Never use three periods, when an ellipsis (see E.2 and E.3) is desired.  
The compromises the effectiveness of erroneous double/triple character-sequence searches.

## 2. References

References are listed here is their content is normative, in that the document would be incomplete without them. Other documents that provide background but not specification material should be included in Annex A.

The following documents contain provisions that, through reference in this document, constitute provisions of this standard. All the standards listed are normative references. Informative references are given in Annex A. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

IEEE Standards Style Manual, October 1996.<sup>1</sup>

ANSI/ISO 9899-1990, Programming Language-C.<sup>2 3</sup>

The Chicago Manual of Style. Chicago: The University of Chicago Press

Words Into Type. Englewood Cliffs, NJ: Prentice-Hall, Inc

An alternative *ReferenceNumb* style is provided for use within proprietary documents, where the convenience of using reference numbers offsets the cost of violating ISO/IEC style requirements.

[R1] IEEE Standards Style Manual, October 1996.

[R2] ANSI/ISO 9899-1990, Programming Language-C.

[R3] The Chicago Manual of Style. Chicago: The University of Chicago Press

[R4] Words Into Type. Englewood Cliffs, NJ: Prentice-Hall, Inc

All the standards listed are normative references. Informative references are given in Annex A. At the time of publication, the editions indicated were valid.

Editors should be aware that approval votes on several draft standards have been delayed due to incomplete reference lists. If other standards are referenced, your standard should clearly state which portions apply. Every reference should include a footnote, clearly specifying how this document can be obtained and/or purchased, so that your reviewers have access to these normative references.

Standards with a specific draft of a standard may be referenced, such as "ISO 646:1991." This improves the stability of your standard, decoupling it from revisions or extensions in your referenced standard. Alternatively, you may reference the most recent version of a standard, such as "ISO 646." This allows your standard to evolve over time and reduces dependencies on potentially out-of-print documents. Both approaches have their advantages and disadvantages that should be carefully considered by the working group.

<sup>1</sup>The IEEE Style Manual is available in pdf format through the IEEE web site:  
<http://standards.ieee.org/guides/index.html>

<sup>2</sup>Replaces ANSI X3.159-1989

<sup>3</sup>ISO documents are available from ISO Central Secretariat, 1 rue de Varembe, Case Postale 56, CH-1211, Geneve 20, Switzerland/Suisse; and from the Sales Department, American National Standards Institute, 11 West 42 Street, 13th Floor, New York, NY 10036-8002, USA

### 3. Terms and definitions

These subclauses contain examples of specifications that shall be included in an IEEE Standard and are highly recommended for use in Company specifications.

#### 3.1 Conformance levels

Several key words are used to differentiate between different levels of requirements and options, as follows:

**3.1.1 expected:** A key word used to describe the behavior of the hardware or software in the design models *assumed* by this standard. Other hardware and software design models may also be implemented.

**3.1.2 may:** A key word that indicates flexibility of choice with *no implied preference*.

**3.1.3 shall:** A key word indicating a mandatory requirement. Designers are *required* to implement all such mandatory requirements.

**3.1.4 should:** A key word indicating flexibility of choice with a strongly preferred alternative. Equivalent to the phrase *is recommended*.

**3.1.5 reserved fields:** A set of bits within a data structure that is defined in this specification as reserved, and is not otherwise used. Implementations of this specification shall zero these fields. Future revisions of this specification, however, may define their usage.

**3.1.6 reserved values:** A set of values for a field that are defined in this specification as reserved, and are not otherwise used. Implementations of this specification shall not generate these values for the field. Future revisions of this specification, however, may define their usage.

These conformance definitions are used throughout IEEE standards and should never be changed.

#### 3.2 Glossary of terms

The following terms are preferred to the use of half-word, word, or double-word to describe register or bus widths, as the meaning of word is highly context sensitive and therefore subject to misinterpretation.

**3.2.1 byte:** Eight bits of data, used as a synonym for octet.

**3.2.2 doublet:** Two bytes of data.

**3.2.3 quadlet:** Four bytes of data.

**3.2.4 octlet:** Eight bytes of data.

Other terms that have special meanings in the context of your document should also be included here. The numbering scheme is necessary for IEEE documents and (for uniformity) shall also be used in Company architecture documents.

### 3.3 Unimplemented locations

The capabilities of reserved, ignored, and unused values are exactly defined, to minimize conflicts between current implementations and future definitions.

**3.3.1 reserved location:** Some locations or portions of locations are not implemented and are defined to be *reserved* (abbreviated as *res* or *r*). When a reserved value is written, a zero values shall be provided; when read, the returned value shall be ignored.

**3.3.2 ignored location:** Selected locations or portions of locations are partially implemented and are defined to be *ignored* (abbreviated as *ign* or *i*). An ignored values has affiliated storage elements, but the values in these storage elements has no side effect. When an *ignored* value is written, a zero value shall be provided; when read, the returned value shall be ignored.

**3.3.3 unused location:** Selected locations or portions of locations may be not implemented or partially implemented and are defined to be either *unused* (abbreviated as *un* or *u*). For *unused* locations, the selection between *reserved* and *ignored* behaviors is implementation dependent.

### 3.4 Acronyms and abbreviations

This document contains the following abbreviations and acronyms:

Editors should update the following list of acronyms based on those used within their drafts. The description is only capitalized when it corresponds to a proper noun.

CSR control and status register  
IEEE Institute of Electrical and Electronics Engineers, Inc.  
RAM random access memory  
ROM read only memory  
TCAM ternary content addressable memory.

#### 3.4.1 Numerical values

Decimal, hexadecimal, and binary numbers are used within this document. For clarity, decimal numbers are generally used to represent counts, hexadecimal numbers are used to represent addresses, and binary numbers are used to describe bit patterns within binary fields.

Decimal numbers are represented in their usual 0, 1, 2, ... format. Hexadecimal numbers are represented by a string of one or more hexadecimal (0-9,A-F) digits followed by the subscript 16, except in C-code contexts, where they are written as 0x123EF2 etc. Binary numbers are represented by a string of one or more binary (0,1) digits, followed by the subscript 2. Thus the decimal number “26” may also be represented as “1A<sub>16</sub>” or “11010<sub>2</sub>”.

### 3.4.2 Field names

This document describes values that are in memory-resident or control-and-status register locations. For clarity, distinct capitalization conventions are used when naming different components, as illustrated in Table 3.1:

**Table 3.1—Names of command, status, and CSR values**

Name	Row	Description
MAX_VALUE	1	A defined constant value.
runCommand	2	A referenced control register.
startCode	3	The <i>startCode</i> field.
start	4	The <i>start</i> bit.
runCommand.startCode	5	The <i>startCode</i> field within the <i>runCommand</i> register.
runCommand.start	6	The <i>start</i> bit within the <i>runCommand</i> register.

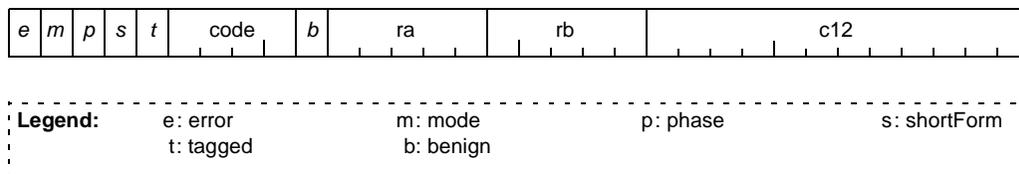
**Row 3.1-1:** Constant values are spelled with capital letters; an underscore separates run-together words.

**Row 3.1-2: Row 3.1-3: Row 3.1-4:** Register names, fields, and bit names start with a lower-case letter; each run-together word starts with a capital letter. Run-together names like *runCommand* are preferred because they are more compact than under-score-separated names (like *run\_command*).

**Row 3.1-5: Row 3.1-6:** When their register location is unclear or ambiguous, the name of a fields includes the name of the register where that field is located.

### 3.4.3 Fields within figures

The location of fields within registers is specified by the cumulative widths of fields within the register, as illustrated in Figure 3.1. The width of each field (in bits) is implied by bottom-line tick marks; the field name is normally contained within its bounding rectangle. When the field name is larger than its bounding rectangle, an abbreviation may be used within the context of the figure, as illustrated for *error*, *mode*, *phase*, *shortForm*, *tagged*, and *benign* bits). The abbreviated name should not be used elsewhere in the draft.



**Figure 3.1—Expanded bit-field descriptions**

### 3.4.4 Bytes within frames

Figure 3.2 provides an illustrative example of another possible byte-sequential data representation. These representations are drawn as fields (of arbitrary size) ordered along a vertical axis, with numbers along the left sides of the fields indicating the field sizes in bytes. Fields are drawn contiguously such that the transmission order across fields is from top to bottom. The example shows that *ttl*, *baseControl*, and *da* are 1-, 1- and 6-byte fields, respectively, transmitted in order starting with the *ttl* field first. .

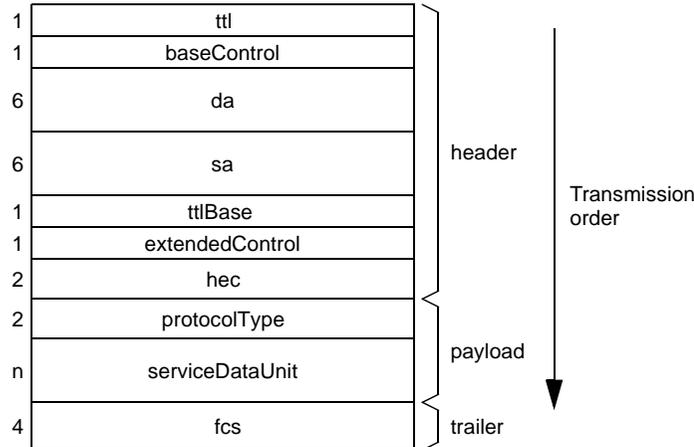


Figure 3.2—Frame contents

The height of the rectangles need not be proportional to its field size, but shall be monotonic with respect to the size of the contained field. Thus, if  $sizeof(b) > sizeof(a)$ , then  $height(b) \geq height(a)$ , where  $sizeof(x)$  and  $height(s)$  represent the byte-count and height associated with rectangle  $x$ .

The right-side arrow and *Transmission order* text are useful when describing this notation. In other illustrations, this information would be redundant and distracting, and is therefore not recommended.

### 3.5 C-code notation

The behavior of data-transfer command execution is frequently specified by C code, such as in Equation 3.1. To differentiate this code from textual descriptions, such C code listings are formatted using a fixed-width Courier font. Similar C-code segments are included within some figures.

```
// Return maximum of a and b values
Max(a,b) {
    if (a<b)
        return(LT);
    if (a>b)
        return(GT);
    return(EQ);
}
```

(3.1)

Since the meaning of many C code operators are not obvious to the casual reader, their meanings are summarized in Table 3.2.

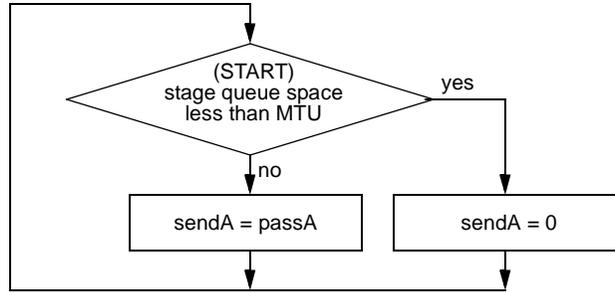
**Table 3.2—C code expressions**

Expression	Description
$\sim i$	Bitwise complement of integer $i$
$i \wedge j$	Bitwise EXOR of integers $i$ and $j$
$i \& j$	Bitwise AND of integers $i$ and $j$
$i \ll j$	Left shift of bits in $i$ by value of $j$
$i * j$	Arithmetic multiplication of integers $i$ and $j$
$! i$	Logical negation of Boolean value $i$
$i \& \& j$	Logical AND of Boolean $i$ and $j$ values
$i \mid \mid j$	Logical OR of Boolean $i$ and $j$ values
$i += j$	Equivalent to $i = i + j$
$i == j$	Equality test, true if $i$ equals $j$
$i != j$	Equality test, true if $i$ does not equal $j$
$i < j$	Inequality test, true if $i$ is less than $j$
$i > j$	Inequality test, true if $i$ is greater than $j$

### 3.6 State machines

The following illustrations have been found useful to some IEEE working groups are therefore provided as optional content material. This material should be deleted if these state machine techniques are not used within the document.

Flow charts are used throughout this document to illustrate high-level functionality, as illustrated in Figure 3.3. Flow charts are typically affiliated with an exact table-structured specification, as illustrated in Table 3.3. .



**Figure 3.3—Flow-control sendA generation**

**Table 3.3—Flow-control sendA generation**

Current state		Row	Next state	
state	condition		action	state
START	$depthStageBuffer < (sizeStageBuffer - MTU)$	1	sendA = 0	CHECK
	—	2	sendA = passA	

**Row 3.3-1:** At least one MTU of stage-queue storage is required to safely buffer client-supplied frames.

**Row 3.3-2:** Setting *sendA* to the *passA* value enables transmissions when stage-buffer space is available.

The first state within all state machines should be distinctive and uniformly defined. The name START is recommended for this purpose.

## 4. Using the templates

### 4.1 Company document numbers

All Company documents should have a distinctive identifier. If a number has not yet been obtained from document control, a default identifier should be used, as illustrated below:

CompanyDVJ2002Jul02

The parameters within this identifier include:

Company - To identify this as a Company authored document.

DVJ - A distinct three-character identifier that identifies the author.

2002Jul02 - The year, month, and day when the first draft was written.

### 4.2 Document variables

Commonly used variables are updated by cross-referencing values within the last *Master* page of this document. These variable values are described in Table 4.4. A few of these variables are themselves cross-references to front-page resident variable; for these, updating the front-page values is recommended.

**Table 4.4—Referenced variables**

Base value	Variable	Description
Front page	JggDvj2003Mar19	Draft number
	April 8, 2003	Publication date
Master page	DRAFT FRAMEMAKER TEMPLATES	Left half of title (even pages)
	FOR WRITING IEEE SPECIFICATIONS	Right half of title (odd pages)
	Copyright 2003 David V. James. All rights reserved.	Copyright notice (top half)
	This is an unapproved draft, subject to change	Copyright notice (bottom)

### 4.3 Paragraph styles

The paragraph styles that this template provides are listed in Table 4.5. The *(continued)* words on this split table were activated by inserting the *Table Continuation* variable after the *Paragraph styles* text. For clarity, such insertions should be done within all large (possibly split across 2 or more pages) tables.

**Table 4.5—Paragraph styles**

Style name	Row	Description	Reference
Annexes	1	Marks the start of annexes	Annex A
Annex1	2	Annex numbering	Annex B
Annex1First	3	Annex numbering (nonbreaking 1st one)	Annex A
AnnexNormative	4	Normative annex title	Annex B
AnnexInformative	5	Informative annex title	B.1
Annex2	6	Level-2 annex heading	B.2
Annex3	7	Level-3 annex heading	B.2.1
Annex4	8	Level-4 annex heading	B.2.1.1
Annex5	9	Level-5 annex heading	B.2.1.1.1
(Annex6)	10	Level-6 annex heading	B.2.1.1.1.1
Body	11	Basic text paragraph	7.5.1
Definition2	12	Level-2 definition paragraph	Clause 6
Definition3	13	Level-3 definition paragraph	6.4
Definition4	14	Level-4 definition paragraph	6.3.2
Definition5	15	Level-5 definition paragraph	6.3.1.2
(Definition6)	16	Level-6 definition paragraph	6.3.1.1.1
EquationCode	17	Equation code; clause enumeration	Equation 7.1
EquationCodeA	18	Equation code; annex enumeration	Equation B.1
EquationCodeMore	19	Equation code; following lines	Equation 7.3
EquationNoNumber	20	Equation paragraph	7.8
EquationTitle	21	Equation numbered paragraph	Equation 7.1
EquationTitleA	22	Equation numbered paragraph (annex)	Equation B.1
FigureText	23	Figure text, left justified, 8 point	7.7.1
FigureTextCenter	24	Figure text, center justified, 8 point	
FigureTextRight	25	Figure text, right justified, 8 point	
FigureLegend	26	Lengend for abbreviated subfield names	xx
FigureTitle	27	Figure title	7.7
FigureTitleA	28	Figure title (annex)	B.3.1

**Table 4.5—Paragraph styles (continued)**

Style name	Row	Description	Reference
Heading1	29	Level-1 clause heading	Clause 5
Heading2	30	Level-2 clause heading	5.1
Heading3	31	Level-3 clause heading	5.1.1
Heading4	32	Level-4 clause heading	5.1.1.1
Heading5	33	Level-5 clause heading	5.1.1.1.1
(Heading6)	34	Level-6 clause heading	5.1.1.1.1.4
Informative	35	Secondary annex label	Annex B
Normative	36	Secondary annex label	
List1	37	First level list	7.5.1
List1First	38	First level list (1st one)	
List1More	39	First level list indent (following)	
List1Dash	40	Dashed (not numbered) first level list	7.5.2
List2	41	Second level list	7.5.1
List2First	42	Second level list (1st one)	
List2More	43	Second level list indent (following)	
List2Dash	44	Dashed (not numbered) second level list	7.5.2
List3	45	Third level list	7.5.1
List3First	46	Third level list (1st one)	
List3More	47	Third level list indent (following)	
List3Dash	48	Dashed (not numbered) third level list	7.5.2
PageBreak	49	Forced page break	7.4
Reference	50	Referenced standard listing	Clause 2
ReferenceNumb	51	Referenced standard listing, numbered	
TableCell	52	Table cell entry, left justified	7.6
TableCellCenter	53	Table cell entry, centered	
TableCellRow	54	Center justified table-row number	
TableHeading	55	Table heading (row-1 table entries)	
TableTitle	56	Table title numbered	

**Table 4.5—Paragraph styles (continued)**

<b>Style name</b>	<b>Row</b>	<b>Description</b>	<b>Reference</b>
TableTitleA	57	Table title numbered (annex)	Table C.1
Title09	58	Bold Helvetica 9-point title	7.10
Title10	59	Bold Helvetica 10-point title	
Title11	60	Bold Helvetica 11-point title	
Title11Right	61	Bold Helvetica 11-point title, left justified	
Title12	62	Bold Helvetica 12-point title	
Title14	63	Bold Helvetica 14-point title	
Title18	64	Bold Helvetica 18-point title	
Title20	65	Bold Helvetica 20-point title	
Title24	66	Bold Helvetica 24-point title	

## 4.4 Cross-reference styles

The cross-reference styles that this template provides are listed in Table 4.6.

**Table 4.6—Cross-reference styles**

Name	Row	Description	Illustrated within	
			Clause	Annex
Annex	1	Annex cross reference	—	Annex E
Bib/Ref	2	Document cross reference	[R2]	[B3]
Clause	3	Clause cross reference	Clause 4	—
Equation	4	Equation cross reference	Equation 7.1	Equation B.1
Figure	5	Figure cross reference	Figure 3.3	Figure B.2
page	6	Provides page number for any cross reference	page 27	page 42
Row	7	Figure portion of figure-row cross-reference	Row 3.1-	Row E.2-
subclause	8	Subclause (or number only) cross reference	1.3	B.3
Table	9	Table cross reference	Table 4.6	Table C.1

**Row 4.6-1:** The *Annex* cross references provide capitalization and nonbreaking space.

**Row 4.6-2:** The *Bib/Ref* cross references provides bracket and distinguishing R/B identifier.

**Row 4.6-3:** The *Clause* cross references provide capitalization and nonbreaking space.

**Row 4.6-4:** The *Equation* cross references provide capitalization and nonbreaking space.

**Row 4.6-5:** The *Figure* cross references provide capitalization and nonbreaking space.

**Row 4.6-6:** The *page* cross references provide a page number of any cross-referenced item.

**Row 4.6-7:** The *Row* cross references provide capitalization, nonbreaking space, and nonbreaking hyphen.

**Row 4.6-8:** The *subclause* cross-references provides the paragraph number.

This style can be used to cross-reference a subclause, subannex, or to complete a *Row* cross-reference.

**Row 4.6-9:** The *Table* cross references provide capitalization and nonbreaking space.

## 5. Clause and subclause headings

The previous *Clause and subclause headings* text was created using the *Heading1* paragraph style and typing the text *Clause and subclause headings*. Each *Heading1* heading is preconfigured to start on a new page; standards may modify this style to eliminate the page break or force an odd-page break, depending on the document length and editorial preferences.

### 5.1 Subclause-2 heading

The previous *Subclause-2 heading* text was created using the *Heading2* paragraph style and typing the text *Subclause-2 heading*. The *Heading2* heading is configured to force before and after spacing, but no page break.

#### 5.1.1 Subclause-3 heading

The previous *Subclause-3 heading* text was created using the *Heading3* paragraph style and typing the text *Subclause-3 heading*. The *Heading3* heading is configured to force before and after spacing, but no page break.

##### 5.1.1.1 Subclause-4 heading

The previous *Subclause-4 heading* text was created using the *Heading4* paragraph style and typing the text *Subclause-4 heading*. The *Heading4* heading is configured to force before and after spacing, but no page break.

##### 5.1.1.1.1 Subclause-5 heading

The previous *Subclause-5 heading* text was created using the *Heading5* paragraph style and typing the text *Subclause-5 heading*. The *Heading5* heading is configured to force before and after spacing, but no page break.

Note this is the deepest level allowed by the IEEE! Thus, you should revise any IEEE document that requires to the use of any level-6 or lower levels. This formatting style is intended to force conformance to good document-style conventions, rather than providing the author with an unlimited range of ill-conceived nesting depths.

##### 5.1.1.1.1.4 Subclause-6 heading

The previous *Subclause-6 heading* text was created using the *Heading6* paragraph style and typing the text *Subclause-6 heading*. The *Heading6* heading is configured to force before and after spacing, but no page break.

Note this is the deepest level that is supported by these formats! Thus, you should revise any document that requires to the use of any level-7 or lower levels. This formatting constraint results from having 9 number levels, with three of these reserved for figure, table, and equation numbering.

## 6. Definitions

Paragraphs of definitions may be distinctively numbered to facilitate their cross referencing by other parts of a document. This should only be done at the lowest level, to avoid discontinuities in the heading numbering, as has occurred with the numbering of 6.3.

**6.1 definedValue2a:** The *Definition2* paragraph style was applied on this paragraph.

**6.2 definedValue2b:** The *Definition2* paragraph style was also applied on this paragraph.

### 6.3 Leading second-level indent

#### 6.3.1 Leading third-level heading

##### 6.3.1.1 Leading fourth-level heading

###### 6.3.1.1.1 Definition6 heading

Within fifth-level subclauses, a sixth-level paragraph style is used to distinctively number paragraphs, as illustrated in 6.3.1.1.1.1. This example was done at the lowest indent, thereby avoiding discontinuities in same-level heading numbering.

**6.3.1.1.1.1 definedValue6a:** The *Definition6* paragraph style was applied on this paragraph.

**6.3.1.1.1.2 definedValue6b:** The *Definition6* paragraph style was also applied on this paragraph.

###### 6.3.1.2 Definition5 heading

Within fourth-level subclauses, a fifth-level paragraph style is used to distinctively number paragraphs, as illustrated in 6.3.1.2.1. This example was done at the lowest indent, thereby avoiding discontinuities in same-level heading numbering.

**6.3.1.2.1 definedValue5a:** The *Definition5* paragraph style was applied on this paragraph.

**6.3.1.2.2 definedValue5b:** The *Definition5* paragraph style was also applied on this paragraph.

#### 6.3.2 Definition4 heading

Within third-level subclauses, a fourth-level paragraph style is used to distinctively number paragraphs, as illustrated in 6.3.2.1. This example was done at the lowest indent, thereby avoiding discontinuities in same-level heading numbering.

**6.3.2.1 definedValue4a:** The *Definition4* paragraph style was applied on this paragraph.

**6.3.2.2 definedValue4a:** The *Definition4* paragraph style was also applied on this paragraph.

## 6.4 Definition3 headings

Within second-level subclauses, a third-level paragraph style is used to distinctively number paragraphs, as illustrated in 6.4.1. This example was done at the lowest indent, thereby avoiding discontinuities in same-level heading numbering.

**6.4.1 definedValue3a:** The *Definition3* paragraph style was applied on this paragraph.

**6.4.2 definedValue3b:** The *Definition3* paragraph style was also applied on this paragraph.

## 7. Text formatting

### 7.1 Editor notes

**Editors' Notes:** *To be removed prior to final publication.*

The spelling checker should be run before this specification is finalized.

The previous note is a single-cell table with a distinctive *EditorsNote* style applied to the enclosed text.

### 7.2 Informative notes

Informative notes can be inserted throughout the document, as illustrated by the following two-paragraph note. Notes are not official parts of the specification—they are merely informative. Contrast this with informative annexes, which are set off in separate sections of the document. This is the reason for setting notes in a different font size.

NOTE—The Note style, shown here, has a fixed "NOTE-" leader and a smaller text font.

The *NoteMore* style (used in this paragraph) is used on note paragraphs that follow the note style, although notes are rarely longer than one paragraph.

### 7.3 Body styles

The *Body* paragraph style is associated with the basic text blocks in this document, including this example. This *Body* style is 10-point Times New Roman, black, with right and left justification. Times New Roman is the serif font that is used primarily throughout this document. Exceptions are Helvetica and Courier fonts: Helvetica is used for headings and figure/table/equation titles; Courier is used for C code.

The *BodyTight* style is similar, but less paragraph-to-paragraph spacing is specified. Thus, such styles are appropriate for acronym listings, as listed below.

NSE    network search engine

RPR    resilient packet ring

SRAM   static random access memory

The *BodyCenter* style is used for centered text, such as written below:

This style is provided for use on IEEE front-cover pages.

## 7.4 Page breaks

Page breaks can be manually inserted by cut-and-pasting a *PageBreak* paragraph at the desired page-break location, as was done before the preceding subclause heading. This convention has been found to be convenient and avoids the need to override default paragraph styles.

## 7.5 Lists

In general, lists are used to display information that does not require explanation or that is offered by way of explanation. Lists that are written in phrases should not allow each item to end in a period or other closing punctuation; rather, only the last item of such a list should allow a period at the end. If however each item in the list is a sentence or a series of sentences, use closing punctuation for each item. Also, it is not necessary to repeat subject information in each list item, nor is it necessary to precede every list with a paragraph ending in a semicolon. It is best to end the paragraph above a list with a period (especially with sentence lists), or with no punctuation at all (with phrase lists).

### 7.5.1 Numbered lists

This *Body* style has the side effect of clearing numbered-list counters, so that a following *List1* paragraph correctly starts with an initial 1) entry. When no *Body* style is included between paragraphs, the list number is reset by starting the list with a distinctive *List1First* paragraph style.

- a) The *List1First* or *List1* paragraph style generates this line of text.
- b) The *List1* paragraph style generates this line of text.
  - 1) The *List2First* or *List2* paragraph style generates this line of text.
    - i) The *List3First* or *List3* paragraph style generates this line of text.
    - ii) The *List3* paragraph style generates this line of text.

You can insert an additional non-numbered paragraphs in a 3rd-level list. To do this, choose the *List3More* style for the non-numbered paragraph, as was done here.
  - 2) The *List2* paragraph style generates this line of text.

You can insert an additional non-numbered paragraphs in a 2nd-level list. To do this, choose the *List2More* style for the non-numbered paragraph, as was done here.
- c) *List1* paragraph style generates this line of text.

You can insert an additional non-numbered paragraphs in a 1st-level list. To do this, choose the *List1More* style for the non-numbered paragraph, as was done here.

### 7.5.2 Dashed lists

When listing a small number of items, you may prefer a dashed list. For example, a simple set of objectives could be placed in a dashed list, illustrated below:

- The paragraph style *List1Dash* created this item.
- Pressing return automatically creates other *List1Dash* paragraphs, such as this one.
  - The paragraph style *List2Dash* created this item.
  - Pressing return automatically creates other *List2Dash* paragraphs, such as this one.
    - The paragraph style *List3Dash* created this item.
    - Pressing return automatically creates other *List3Dash* paragraphs, such as this one.

Note that the same indentation spacing is used for List and ListDash paragraph styles, but ListDash items use em dash, instead of numerated values. The ISO/IEC specification doesn't allow the use of bulleted lists, so dashes are used at all levels.

## 7.6 Tables

Tables use several formatting tags. First, when inserting a table, choose *Table/Insert Table/IEEE format*. Adjust heading row, row, and column amounts as necessary. Then use the *TableHeading* and *TableCell* paragraph styles, as shown in Table 7.1.

**Table 7.1—An illustrative table**

Value	Name <sup>a</sup>	Row	Description
0	BASIC <sup>b</sup>	1	The basic mandatory behavior
1	EXTRA	2	The extended option behavior
2-15	—	3	Reserved

<sup>a</sup>A footnote can be added to any table heading

<sup>b</sup>A footnote can also be added to any table cell.

Tables should contain small items, not paragraphs of explanatory text. A row-number cross-reference can be used to cross-reference a row with detailed following comments, as listed below.

**Row 7.1-1:** A detailed description of a row can be placed after the table. This has the benefit of maintaining a concise table, while allowing each row to be described in detail.

**Row 7.1-2: Row 7.1-3:** Multiple rows can be described together, by placing both cross-referenced before the combined description, as was done here.

Although not mandatory, a 30% shading is useful to identify rows with reserved or unused values.

The first number in the row cross reference is generated by cross-referencing the *TableTitle* text. The second portion of the reference is created by cross referencing the appropriate row number value.

Use the Table pull-down menu to modify the number of rows and columns, or to straddle rows/columns as desired.

The *TableHeading* style is used on the top row, which sets the style as {Helvetica, bold, centered}. The *TableCell* style creates a left justified table-cell entries, as illustrated in the right column. The *TableCellCenter* style creates centered table-cell entries, as illustrated in the left columns. The *TableCellRow* style is used to establish the row count within the *Row* headed column.

To insert a table footnote, select the desired spot within the appropriate table text. Then select the toolbar to select *Special/Footnote* and a footnote will be generated.

The table format specifies a light *very thin* line at the bottom of the figure, with the intent of forcing this thickness (on the initial bottom lines) when the table is split across pages. Thus, manual intervention may sometimes be necessary, to force a darker *thin* bottom line on the last row of the table.

## 7.7 Native FrameMaker figures

### 7.7.1 Figure creation

Within these templates, figures are implemented as a special form of 1-cell table with a “None” outline style. This has the advantage that figures have the same capabilities as tables (automatic attached captions, self-centering contents, etc.). To insert a figure within text, place the insertion point at the desired location and use the *Table* menu to insert a table entry, format *Figure*. The insertion point is now at the proper point, so use the *Special* menu to select *Anchored Frame*, and click *New Frame*. Expand the frame to the desired size, then draw and/or insert your graphics material to produce something as illustrated by Figure 7.1.



Figure 7.1—Quadlet register illustrations

Many editors find it **easier to cut-and-paste an existing figure** reference, picking a figure that has similar graphics elements. Earlier versions of FrameMaker® generated aliased cross-references when figures were pasted, but this problem has been fixed in newer versions.

The rectangle labels in the above figure were created by using the *A* text tool in the graphics palette, which has no frame associated. This simple line of text can be made black or white, but does not automatically include a white background. White letters may be produced on a sufficiently dark background by selecting the text, using the character designer dialog box, and then choosing the color *white*. Since copies often lose the shading details of the original, shaded colors should be limited to three: white, grey, and black. When black shading is used, the text color should be white.

The abbreviation text used the *FigureText* style, inside a textual box, to force left justification. The *FigureTextCenter* and *FigureTextRight* styles are available to force center and right justification respectively. All styles utilize a 10-point Helvetica font.

### 7.7.2 Snap grid usage

When drawing graphics, we **STRONGLY** suggest that the snap grid be used, so that graphics can be more easily modified at a later date. A snap-grid value of 3 points (1/24 of an inch) is recommended, for compatibility with simple 72 dots-per-inch software as well as modern 600 dots-per-inch printers.

If an old drawing is **no longer on the snap grid**, bring it back before continuing with the editing session; select everything within the image, being careful to select a rectangle (or other known-to-be-aligned-with-grid object) last. Then move the selected objects to the desired snap-grid location. If the image has been corrupted so that the snap grid is of little use, turn on “gravity” instead.

If you use cut-and-paste to create a new figure from a previous figure, you may accidentally copy the cross-references along with the figure, and this can confuse later references. So, after pasting surrounding text and figure, immediately delete the *figure 1* cross-reference and the *T* reference mark before *Figure illustration*. You may then create a new reference for the new figure, without introducing confusion.

### 7.7.3 Maintaining the snap grid

The reference point within a FrameMaker drawing, is the top-left corner. To maintain the snap-grid, this reference point should never be changed. Thus, expansion (or contraction, not shown) of a FrameMaker drawing should be made by using a click-and-slide motion on the bottom-center, the right-center, or the bottom-right handles only, as illustrated in Figure 7.2.

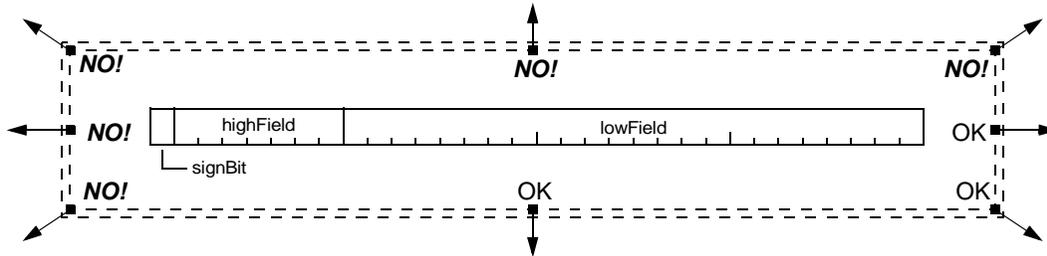


Figure 7.1—Quadlet register illustration

Figure 7.2—FrameMaker expansion and contraction restrictions

### 7.7.4 Flow-chart styles

A distinct *FigureTextCenter* style is used within flow chart decision components, as illustrated in Figure 7.3. This Helvetica 8-point centered style is typically applied to text within conditional-branch components.

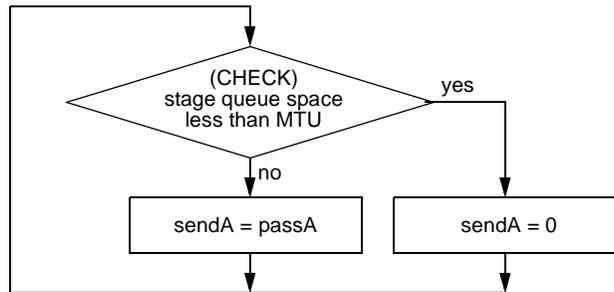


Figure 7.3—Flow-control sendA generation overview

The *(CHECK)* text used the *FigureTextCenter* style, inside a textual box, to invoke usage of a smaller 8-point font. The *FigureText* and *FigureTextRight* styles are available to force left- and right-justification respectively, while using the smaller 8-point Helvetica font.

### 7.7.5 Multicell figures

A sequence of events is often best illustrated as a collection of cells, as illustrated in Figure 7.4. Cells and actions-within-cells are have alphabetic and numerical labels, for convenient list cross-referencing.

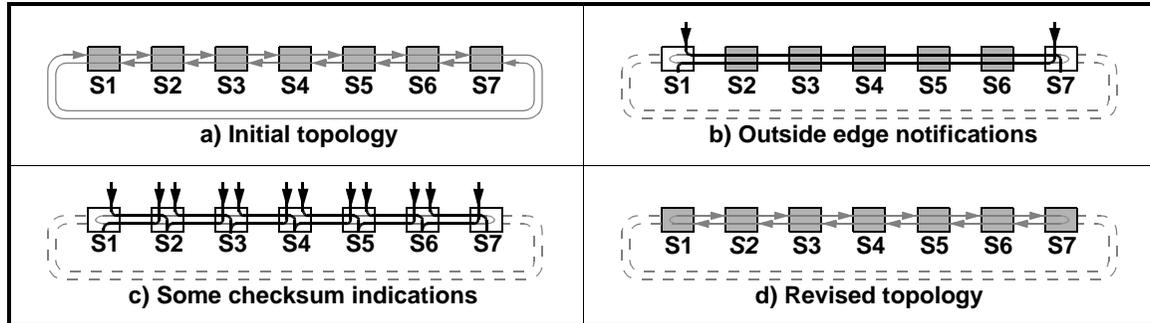


Figure 7.4—Severed loop discovery

For example, the reconfiguration sequence of Figure 7.4 could be described below.

- a) The span between stations S1 and S7 becomes nonfunctional after an operational component failure.
- b) Stations S1&S7 invoke containment and deactivate their failed span.
- c) Stations transmit revised checksums to their neighbors.
- d) Normal operation continues, utilizing the revised database for ringlet selection.

### 7.8 Equations

An equation involves the use of the *Equation* format, as illustrated in Equation 7.1. The equation may be left-justified, indented, or centered based on the number of left-side tabs. A rightside autonumber specifier provides the right-side equation number.

$$v = 2^7 \left( -b_0 + \sum_{i=0}^{k-1} b_i 2^i \right) \tag{7.1}$$

An equation is a mathematical expression created by using the *Equation Editor* feature of Framemaker. When inserting an equation choose **New Medium Equation** from the menu.

An unnumbered equation involves the use of the *EquationNoNumber* format, as illustrated below. This format is allowed but discouraged, due to the difficulty of resolving ambiguous equation cross-references.

$$v = 2^7 \left( -b_0 + \sum_{i=0}^{k-1} b_i 2^i \right)$$

A variable list often follows an equation. The “where” is set as text. This list itself uses the paragraph format *VariableList*. Note that a tab is used between the variable and the definition of that variable.

where  
 X      is 0

## 7.9 Computer code

### 7.9.1 Short in-line C code

A few lines of C code can be expressed as an equation, as illustrated by Equation 7.2. The *EquationCode* style is used to select the proper C-Code font.

```
crcValue= CrcStep32(crcValue);
```

 (7.2)

A few more lines of C code can be expressed as an equation, as illustrated by Equation 7.3. The *EquationCodeMore* style is used to select the proper C-Code font for the following lines.

```
crcStep(crcValue)
{
    crcValue= crcStep32(crcValue);
    return(crcValue);
}
```

 (7.3)

### 7.9.2 Lengthy C code

Lengthy C code (which is typically defined as code listings covering more than 1/2 page) should be placed in an annex, such as Annex F. An annex can support a wider 132-character width while allowing the code to be more easily extracted by the reader.

## 7.10 Title styles

Title styles are used primarily on the cover and introductory pages, although these styles can be used anywhere. The styles differ only in their size and left/right justification, as illustrated below:

**Text with Title24 paragraph style**

**Text with Title20 paragraph style**

**Text with Title18 paragraph style**

**Text with Title14 paragraph style**

**Text with Title12 paragraph style**

**Text with Title11 paragraph style**

**Text with Title11Right paragraph style**

**Text with Title10 paragraph style**

## 7.11 Cross references

Cross references can help in updating and keeping track of changes in a document. They are especially useful during the development of the draft as the document may be restructured. Cross references can be used to cross-reference clauses and subclauses (e.g., see 3.2) and bibliographic entries (e.g., see [B7]). To insert a cross reference, choose *Special/Cross-Reference*. Select the type of item, then select the item you wish to cross reference and click *Insert*. Now if you change the number of the subclause or bibliography entry you can update your document to reflect those changes (Edit/Update References/All Cross-References).

## 7.12 Autonumbered styles

Several autonumbered styles are utilized by these formats, although their usage is expected to be transparent to the user. For the convenience of the reader and future style editors, these autonumbered formats are summarized below.

- A Assigns numbers to each annex; also each subannex, figure, table, and equation within an annex.  
The figures, tables, and equations are cleared at the start of each annex.  
The subannex numbers are cleared at the start of each higher-level annex/subannex;
- B Assigns numbers to each 1st, 2nd, and 3rd level list.  
The 1st level list is cleared by a previous *Body* style.  
The 2nd and 3rd level list numbers are cleared at the start of each 1st level list.
- D Prepends a dash to each 1st, 2nd, and 3rd level list.
- H Assigns numbers to each clause; also each subclause, figure, table, and equation within a clause.  
The figures, tables, and equations are cleared at the start of each clause.  
The subclause numbers are cleared at the start of each higher-level clause/subclause;
- N Prepends the “NOTE—” text to the start of each *Note* paragraph.
- T Assigns distinct sequential numbers to each *TableCellRow* paragraph (see 7.6).  
The *TableHeading* format within the header of each table clears this number count.

## **8. Special pages**

### **8.1 Master pages**

Master pages contain text that is used on all pages of the document (running heads, footers, copyright statements). To insert the title and number of your document in the running head, go to the master page and make changes there (View/Master Pages). The copyright statement must remain on each page of your draft, as must the word Draft in the title, and the “P” preceding the standard designation in the running head.

### **8.2 Reference pages**

TBD.

## Annexes

### Annex A

(informative)

### Bibliography

The annex always starts with the Annex style followed by the Annex1First style. The first annex is always the bibliography, which lists informational references that provide useful background information for understanding the specification.

The most recent editions of the following texts are recommended by the IEEE as guides on points of editorial style and usage:

[B1] IEC Multilingual Dictionary of Electricity, Electronics, and Telecommunications, Amsterdam: Elsevier Science Publishers.

[B2] IEEE-SA Standards Board Bylaws, New York: Institute of Electrical and Electronics Engineers, Inc.

[B3] IEEE-SA Standards Companion, New York: Institute of Electrical and Electronics Engineers, Inc.

[B4] IEEE-SA Standards Operations Manual, New York: Institute of Electrical and Electronics Engineers, Inc.

[B5] IEEE100, The Authoritative Dictionary of IEEE Standards Terms, Seventh Edition, New York, Institute of Electrical and Electronics Engineers, Inc.

[B6] Miller, C., and Swift, K. The Handbook of Nonsexist Writing. New York: Harper Collins.

[B7] Webster's New Collegiate Dictionary. Springfield, MA: Merriam-Webster, Inc.

## A.1 Bibliography references

The following is a list of on-line locations that are useful resources for creating a bibliography that contains multiple types of references. This list is by no means comprehensive, but it will serve to answer most questions about the creation and development of bibliographies, and will in some cases provide pointers to other sites of interest.

[B8] <http://www.spaceless.com/WWWVL/><sup>4</sup>

[B9] <http://www.lmu.ac.uk/lss/l/docs/Harvard/bib.htm><sup>5</sup>

[B10] <http://www.lmu.ac.uk/lss/l/docs/Harvard/types.htm><sup>6</sup>

[B11] <http://standards.ieee.org/catalog/olis/index.html><sup>7</sup>

## A.2 Grammar references

The following is a list of resources that provide information and pointers for further research into the intricacies of the English language. Most common questions may be answered in the FAQ sections of these online sites; the more esoteric points of interest may be resolved with only a little looking around.

[B12] <http://ccc.comnet.edu/grammar/><sup>8</sup>

[B13] <http://www.ohiou.edu/esl/english/index.html><sup>9</sup>

[B14] <http://englishplus.com/grammar/><sup>10</sup>

[B15] <http://www.edunet.com/english/grammar/index.cfm><sup>11</sup>

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<sup>4</sup>The Electronic References & Scholarly Citations of Internet Sources

<sup>5</sup>The Harvard Style of Referencing, "Cite References in a Bibliography"

<sup>6</sup>The Harvard Style of Referencing, "Source Types and Examples"

<sup>7</sup>The Institute of Electrical and Electronics Engineers Standards Online.

<sup>8</sup>Guide to Grammar and Writing

<sup>9</sup>Ohio State University English as a Second Language, "Resources for English Language and Culture"

<sup>10</sup>English Grammar Slammer (n.b.: although this site is for a particular product, it provides a great deal of information and help in the area of English language and grammar)

<sup>11</sup>Education Net: Language, "The Online English Grammar."

## Annex B

(normative)

### Annex styles

#### B.1 Annex headings

The Annex sections start with an *Annexes* paragraph style; the paragraph style (not manually entered text) is responsible for providing the “Annexes” text. This paragraph also clears the autonumbering counters, that apply to clauses, subclauses, figures, tables, and equations and provides text for the table of contents.

Each annex begins with three special paragraphs, whose type depend on the annex properties, as follows:

- a) Initial. For the initial informative annex, the following components:
  - 1) *Annex1First*. The non-breaking 1st-paragraph style provides the *Annex A* autonumbered text.
  - 2) *Informative*. The 2nd-paragraph style provided the spacing and (*informative*) text.
  - 3) *AnnexInformative*. The 3rd-paragraph style provided the *Bibliography* text.  
This entry also contains hidden (white text) components to facilitate table-of-contents entries.
- b) Normative. For other normative annexes, the following components:
  - 1) *Annex1*. The page-breaking 1st-paragraph style provides the *Annex B* autonumbered text.
  - 2) *Normative*. The 2nd-paragraph style provided the spacing and (*normative*) text.
  - 3) *AnnexNormative*. The 3rd-paragraph style provided the *Annex headings* text.  
This entry also contains hidden (white text) components to facilitate table-of-contents entries.
- c) Informative. For the other informative annexes, the following components:
  - 1) *Annex1*. The page-breaking 1st-paragraph style provides the *Annex C* autonumbered text.
  - 2) *Informative*. The 2nd-paragraph style provided the spacing and (*informative*) text.
  - 3) *AnnexInformative*. The 3rd-paragraph style provided the *Using FrameMaker* text.  
This entry also contains hidden (white text) components to facilitate table-of-contents entries.

Users have the freedom of redefining the properties of the AnnexA/B/C styles, but should not change their names or overall behaviors, because the formation of table-of-contents entries assumes special hidden content contained within the *AnnexNormative* and *AnnexInformative* styles.

#### B.2 Subannex-2 heading

The previous *Subannex-2 heading* text was created using the *Annex2* paragraph style and typing the text *Subannex-2 heading*. The *Annex2* paragraph forces before and after spacing, but no page break.

##### B.2.1 Subannex-3 heading

The previous *Subannex-3 heading* text was created using the *Annex3* paragraph style and typing the text *Subannex-3 heading*. The *Annex3* paragraph forces before and after spacing, but no page break.

##### B.2.1.1 Subannex-4 heading

The previous *Subannex-4 heading* text was created using the *Annex4* paragraph style and typing the text *Subannex-4 heading*. The *Annex4* paragraph forces before and after spacing, but no page break.

**B.2.1.1.1 Subannex-5 heading**

The previous *Subannex-5 heading* text was created using the *Annex5* paragraph style and typing the text *Subannex-5 heading*. The *Annex5* paragraph forces before and after spacing, but no page break.

Note this is the deepest level allowed by the IEEE! Thus, your should revise any IEEE document that requires to the use of any level-6 or lower levels. This formatting style is intended to force conformance to good document-style conventions, rather than providing the author with an unlimited range of ill-conceived nesting depths.

**B.2.1.1.1.1 Subannex-6 heading**

The previous *Subannex-6 heading* text was created using the *Annex6* paragraph style and typing the text *Subannex-6 heading*. The *Annex6* paragraph forces before and after spacing, but no page break.

Note this is the deepest level that is supported by these formats! Thus, your should revise any document that requires to the use of any level-7 or lower levels. This formatting constraint results from having 9 number levels, with three of these reserved for figure, table, and equation numbering.

**B.3 Other annex styles****B.3.1 Annex figures**

Within the annex, a distinct figure title style *FigureTitleA* is used, as illustrated in Figure B.2. The distinct style allows the coupling of figure and annex heading styles. Although the style name is different, cross-referencing is done in a similar fashion.



**Figure B.2—Quadlet register illustrations**

### B.3.2 Annex tables

Within the annex, a distinct table style *TableTitleA* is also used, as illustrated in Table B.1. Although the style name is different, cross-referencing is done in a similar fashion.

**Table B.1—An illustrative table**

Value	Name	Row	Description
0	BASIC	1	The basic mandatory behavior
1	EXTRA	2	The extended option behavior
2-15	—	3	Reserved

**Row B.1-1: Row B.1-2:** An example of how to describe the first two rows.

**Row B.1-3:** An example of how to describe the final row.

### B.3.3 Annex equations

Within the annex, a distinct equation title style *EquationTitleA* is used, as illustrated in Equation B.1. The distinct style allows the coupling of equation and annex heading styles. Although the style name is different, it is cross referenced in a similar fashion.

$$v = 2^7 \left( -b_0 + \sum_{i=0}^{k-1} b_i 2^i \right) \tag{B.1}$$

## B.4 Computer code

### B.4.1 Short in-line C code

A few lines of C code can be expressed as an equation, as illustrated by Equation B.2. The *EquationCodeA* style is used to select the proper C-Code font.

$$\text{crcValue} = \text{CrcStep32}(\text{crcValue}); \tag{B.2}$$

## Annex C

(informative)

### Common grammatical issues

This annex is designed to point out and clarify common grammatical issues that affect many writers of English that have English as a secondary language. This section is presently small, but will grow over time to support the needs of specification writers.

#### C.1 Use of the word "the"

The word *the* is often misplaced in English sentences. Though there about 11 rules for using this word, only seven of them are directly applicable to writing our specifications.

- a) 1) Showing that something or someone has already been spoken or written about, or is already known to the reader.  
*The function block shown above shows...*  
not *Function block above shows...*
- b) Used with things because they are well known.  
*The 61883-1 document states...*  
not *61883-1 document states...*
- c) Showing that something is the only one of its kind.  
*The READ DESCRIPTOR command reads data from the Subunit Identifier Descriptor*  
not *READ DESCRIPTOR command reads the data from Subunit Identifier Descriptor*
- d) Showing the reader that the writer means one particular thing.  
*The printer shall respond to the command by...*  
not *Printer shall respond to command by...*
- e) Used for particular sets of things.  
*All of the subunit's descriptor length fields shall be...*  
not *All of subunit's descriptor length fields shall be...*
- f) with comparison  
*The larger the filesize, the longer it takes to download.*  
not *With larger of filesize, longer it takes to download.*
- g) with superlative  
*This shall be the largest data structure.*  
not *This shall be largest data structure.*

## C.2 Use of the word "a" or "an"

The word a or an (when preceding a word that starts with a vowel) is also often misplaced and misused in English sentences. Though there about 6 rules for using this word, only several of them are really applicable to writing our specifications.

- a) One among many  
*When the button is pressed, a new picture is taken.*  
not *When button is pressed, the new picture is taken.*
- b) One in particular  
*The output is a color picture*  
not *The output is color picture*
- c) General one  
*The target sends an FTP packet*  
not *Target sends FTP packet*

## C.3 Numbers: numerical or alphabetical?

In general, any number lower than ten shall be written alphabetically, unless it is used in an equation or in a sequence. As examples,

- Command *A* can process ten pictures. Command *B* can process 100.
- The range of values shall be between 5 - 15.

## C.4 *That* and *which*

*(Extracted from [R1] IEEE Standards Style Manual)*

The words *that* and *which* are commonly misused; they are not interchangeable. *That* is best reserved in essential (or restrictive) clauses, *which* is appropriate in nonessential (or nonrestrictive), parenthetical clauses. Simply stated, if a comma can be inserted before the word *that* or *which*, the word should be *which*. If a comma would not be used, the word to use is *that*.

*Examples:*

- a) Defining the inputs and outputs provides a better understanding of the steps *that* are necessary to complete the process.
- b) Defining the inputs and outputs provides a better understanding of these steps, *which* are explained in 5.1 through 5.9.

## C.5 Gender-Neutral language

(Extracted from [R1] IEEE Standards Style Manual)

In order to reflect the changing practices in language usage, the IEEE Standards Department uses, in as many cases as possible, generic titles (such as *chair* rather than *chairman*) in the body of the standard. The following practices shall apply:

- a) When writing in the third person, the phrase *he or she* shall be used. The male or female pronoun alone or the variations *he/she* or *s/he* shall not be used. Also, the pronoun *they* shall not be used as a singular pronoun.
- b) If a particular sentence becomes cumbersome when *he or she* is used, the sentence should be rewritten in the plural or completely rewritten to avoid using pronouns. The indefinite pronoun *one* should be avoided. In references to a company, the pronoun *it*, not *we* or *they*, should be used.

## C.6 Use of the second-person form of address

(Extracted from [R1] IEEE Standards Style Manual)

The second-person form of address (*you*) should not be used or implied in standards, e.g., “*You should avoid working on lines from which a shock or slip will tend to bring your body toward exposed wires.*” This should be rewritten to identify the addressee, as follows: “*Employees should avoid working on lines from which a shock or slip will tend to bring their bodies toward exposed wires.*”

## C.7 Table cell justification

Table cells are sometimes centered and sometimes left justified, as illustrated in Table C.1.

**Table C.1—Example table**

Value	Name	Description
0	TEST_START	Start of the built-in self test
1	TEST_STOP	Stops the command-invoked self test after the next subtest completion
2-15	TEST_ABORT	Aborts the command-invoked self test immediately

Text alignment in table cells shall have the following rules:

- a) If the text is a sentence, or resembles a sentence, then the text is left-justified.
- b) If the text is not a sentence (e.g. it is a phrase of one or two words), then the text is centered.

## Annex D

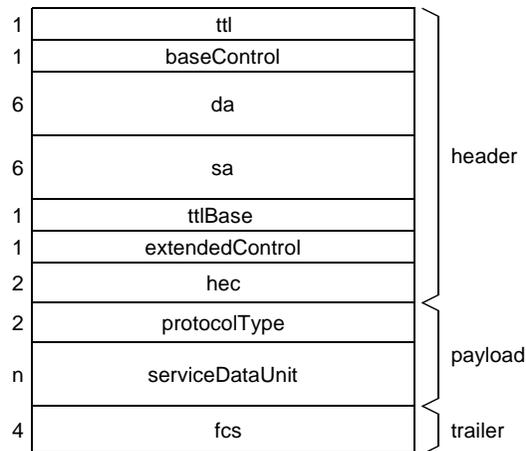
(informative)

### FrameMaker guidelines

#### D.1 Field formats within figures

##### D.1.1 Frame format illustrations

Figure D.1 is an example of how frame formats should be illustrated (in this context, frame connotes the media-independent portion of a transmitted packet). Names and numbers use an 8-point Helvetica font (as is true for all figures). Each name is horizontally centered in its box, byte numbers are right justified, and header/payload/trailer names are left justified. The byte-size and field names are vertically centered in their box, then moved upward one helicopter tick (which yields a vertically centered appearance). Similarly, the header/payload/trailer names are vertically centered with their spanning line, then moved upward one helicopter tick.

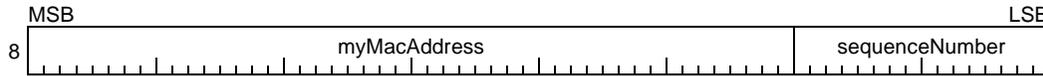


**Figure D.1—Frame format illustrations**

The fields are stacked vertically and have adjacent byte-size labels. The size of component boxes should be monotonic with the components size; if  $\text{Sizeof}(\text{fieldA}) > \text{Sizeof}(\text{fieldB})$  then  $\text{Height}(\text{fieldA}) \geq \text{Height}(\text{fieldB})$ .

## D.1.2 Generic field illustrations

Figure D.2 illustrates how subfield components of multibyte fields should be produced. For clarity, short and longer tick marks are used to delineate bit and byte positions respectively.



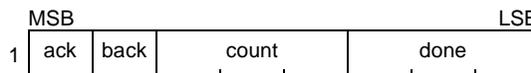
**Figure D.2—Example of a bit-field illustration**

The field names, byte-size numbers, and MSB/LSB labels use an 8-point Helvetica font. Each field name is horizontally centered in its box; the byte number and LSB label are right justified; the MSB label is left justified. The byte-size and field names are vertically centered in their box, then moved upward one helicopter tick, to yield a more vertically centered appearance.

Depending on the width of field illustrations, the spacing between tick marks may be changed. Such tick-mark-spacing changes are most conveniently performed by grouping tick marks and box from an existing example (such as Figure D.1) and then stretching the grouped image. To simplify current and future editing, care should be taken to ensure that the final box is snapped to the 3-point grid and the tick-mark spacing is an exact multiple of the 3-point grid size.

## D.1.3 8-bit field format

Figure D.3 illustrates how subfield components of a 1-byte field should be illustrated. Only short tick marks are used, since there is no need to delineate byte locations. The font and alignment associated with field names, byte-size number, and MSB/LSB labels is specified in D.1.2.



**Figure D.3—8-bit field format**

Abbreviations are used when the field name would extend beyond its bounding box, see D.1.5 for details.

## D.1.4 16-bit field formats

Figure D.4 illustrates how subfield components of a 2-byte field should be illustrated. Short tick marks and one longer tick mark are used, to delineate bit and byte locations. The font and alignment associated with field names, byte-size number, and MSB/LSB labels is specified in D.1.2.

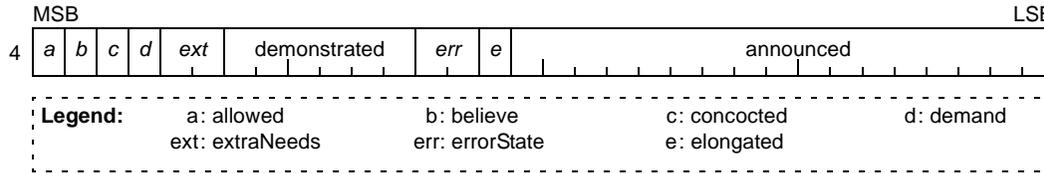


**Figure D.4—16-bit field format**

Abbreviations are used when the field name would extend beyond its bounding box, see D.1.5 for details.

### D.1.5 32-bit field formats

Figure D.4 illustrates how subfield components of a 2-byte field should be illustrated. Short tick marks and three longer tick marks are used, to delineate bit and byte locations. The font and alignment associated with field names, byte-size number, and MSB/LSB labels is specified in D.1.2. Each field name that would extend beyond its bounding box is abbreviated; a legend associates the local abbreviation with the formal field name.



**Figure D.5—32-bit field format**

Below the fields, the inserted text paragraph style is *FigureLegend*, which provides the leading label and center justifies the within tab entries (keying off of the ‘:’ character). The legend entries are ordered, in that a left-to-right scan of the fields corresponds to a left-to-right-then-top-to-bottom scan of the legend entries. A thin space (escape-space-t) should be included before the intermediate colons, a regular nonbreaking space after the colon. The dotted line around the legend is a distinct graphics rectangle, which can be sized appropriately.

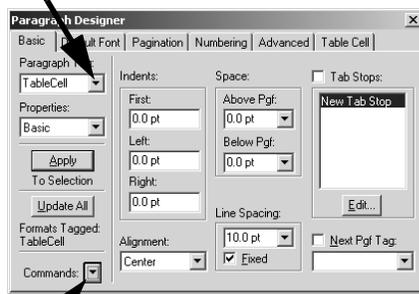
NOTE—The fields of Figure D.5 were planned to illustrate several of the larger byte-boundary tick marks. Depending on the field alignments, these are oftentimes hidden by the field’s bounding box.

## D.2 Managing deprecated styles

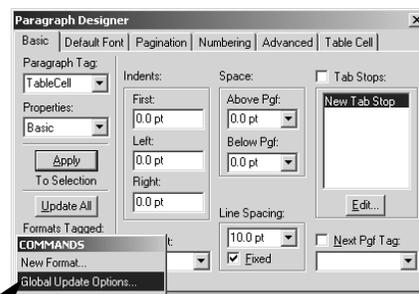
### D.2.1 Converting deprecated styles

A variety of sources has yielded a collection of styles, some of which have been deprecated and should be updated to the current style names. The process of changing a specific deprecated name starts with the invoking the *Paragraph Designer*, as illustrated in Figure D.6.

- 1) Use **control m** to open the following screen
- 2) Scroll to select the desired final style



- 3) Click here to invoke special commands



- 4) Click here to access global update options

Figure D.6—Converting deprecated styles, phase 1

A variety of sources has yielded a collection of styles, some of which have been deprecated and should be updated to the current style names. The process of changing a specific deprecated name starts with the invoking the *Paragraph Designer*, as illustrated in Figure D.7.

- 5) Click **All Properties**



- 6) Type in the deprecated style



- 7) Click the **Update** button



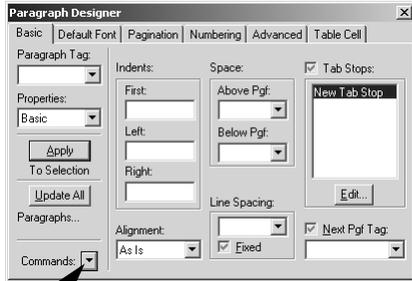
- 8) Click the **OK** button

Figure D.7—Converting deprecated styles, phase 2

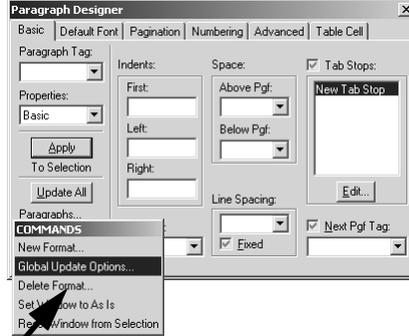
### D.2.2 Deleting deprecated styles

After converting the deprecated styles, these styles should be deleted. The process of deleting a specific deprecated name starts with the invoking the *Paragraph Designer*, as illustrated in Figure D.8.

1) Use *control m* to open the following screen



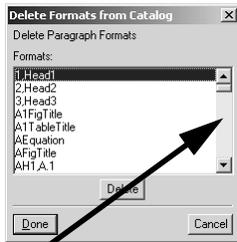
2) Click here to invoke special commands



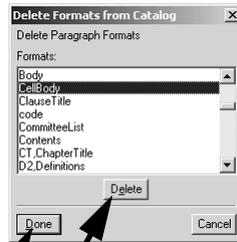
3) Click here to activate the deletion window

Figure D.8—Deleting deprecated styles, phase 1

The process of deleting deprecated styles concludes with the selection of that style, followed by the appropriate clicks, as illustrated in Figure D.9. Note that multiple styles can be deleted before clicking the *Done* button to exit the window.



4) Scroll to select the deprecated style



5) Click *delete*  
 6) Click *done* after final deletion

Figure D.9—Deleting deprecated styles, phase 2

## Annex E

(informative)

### Using FrameMaker

#### E.1 Special mathematical symbols.

Table E.1—Special symbols and operators

Character	Meaning	Frame 6.0 character code	Font
*	Boolean AND	ALT-042	Symbol
+	Boolean OR, Arithmetic addition	ALT-043	Symbol
^	Boolean XOR	^	Times
!	Boolean NOT	ALT-033	Symbol
<	Less than	ALT-060	Symbol
≤	Less than or equal to	ALT-0163	Symbol
=	Equal to	ALT-061	Symbol
≠	Not equal to	ALT-0185	Symbol
≥	Greater than or equal to	ALT-0179	Symbol
>	Greater than	ALT-062	Symbol
←	Assignment operator	Control-q \	Symbol
∈	Indicates membership	ALT-0206	Symbol
∉	Indicates nonmembership	ALT-0207	Symbol
±	Plus or minus (a tolerance)	Control-q 1	Times
×	Degrees (as in degrees Celsius)	ALT-0176	Symbol
∑	Summation	ALT-0229	Symbol
†	Dagger	Control-q Space	Times
‡	Double dagger	Control-q ´	Times
μ	Micro	Control-q 5	Times
Ω	Omega	ALT-087	Symbol
λ	Lambda	ALT-0108	Symbol

## E.2 Windows special characters

For the convenience of the Window's user, Framemaker/Window's commonly-used special characters are described within Table E.2.

**Table E.2—Framemaker/Window's special characters**

Description	Row	Character	Press
Space characters	1	Em space	escape space m control-shift-space
	2	En space (1/2 of em space)	escape space n Alt-control-space
	3	Thin space (1/2 of en space)	escape space t
	4	Numeric space (width of digit)	escape space l
	5	Nonbreaking space	control+space
Line break	6	line break	shift+return
Special characters	7	• ( <i>bullet</i> )	control+q %
	8	... (ellipsis)	control+q shift+i
	9	© (copyright)	control+q )
	10	™ (trademark)	control+q *
	11	® (registered trademark)	control+q (
Printable hyphens and dashes	12	en dash	control+q shift+p
	13	em dash	control+q shift+q
	14	non-breaking hyphen	escape hyphen h
Hyphenation control	15	suppressing hyphens	escape n s
	16	discretionary hyphen	control+hyphen
Smart quotes override	17	' (single quote)	control+'
	18	" (double quote)	escape+"
Return to normal	19	hypertext->normal mode	

### E.3 Macintosh special characters

For the convenience of the user, Framemaker/Macintosh commonly-used special characters are described within Table E.3.

**Table E.3—Framemaker/Mac special characters**

Description	Row	Character	Press
Space characters	1	Em space	command+option+9
	2	En space (1/2 of em space)	command+option+8
	3	Thin space (1/2 of en space)	command+option+7
	4	Numeric space (width of digit)	command+option+0
	5	Nonbreaking space	option+space
Line break	6	line break	shift+return
Special characters	7	• ( <i>bullet</i> )	option+8
	8	... (ellipsis)	option+;
	9	© (copyright)	option+g
	10	™ (trademark)	option+2
	11	® (registered trademark)	option+r
Printable hyphens and dashes	12	en dash	option+hyphen
	13	em dash	shift+option+hyphen
	14	non-breaking hyphen	command+'grave)
Hyphenation control	15	suppressing hyphens	command+option+hyphen
	16	discretionary hyphen	command+hyphen
Smart quotes override	17	' (single quote)	control+'
	18	" (double quote)	control+"
Return to normal	19	hypertext->normal mode	command+option+e

## **Annex F**

(informative)

### **IEEE specifics**

#### **F.1 Common references**

So that common references can be included within this document, cross references are provided for cut-and-paste uses:

AEIC publications are available from the Association of Edison Illuminating Companies, 600 N. 18th Street, P. O. Box 2641, Birmingham, AL 35291-0992, USA.

ANSI publications are available from the Sales Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA.

API historical materials can be obtained (for a fee) from the American Petroleum Institute Library, 1200 L Street NW, Washington, DC 20005, USA.

API publications are available from the Publications Section, American Petroleum Institute, 1200 L Street NW, Washington, DC 20005, USA.

ARINC publications are available from ARINC Research Corporation, Document Section, 2551 Riva Rd., Annapolis, MD 21401.

ASHRAE publications are available from the Customer Service Department., American Society of Heating, Refrigerating and Air Conditioning Engineers, 1791 Tullie Circle, NE, Atlanta, GA 30329, USA.

ASME publications are available from the American Society of Mechanical Engineers, 22 Law Drive, Fairfield, NJ 07007, USA.

ASTM publications are available from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, USA.

AWEA publications are available from the American Wind Energy Association, Standards Program, 777 North Capital Street NE, #805, Washington, DC 20002, USA.

CCITT publications are available from the International Telecommunications Union, Sales Section, Place des Nations, CH-1211, Genève 20, Switzerland/Suisse. They are also available in the United States from the

U.S. Department of Commerce, Technology Administration, National Technical Information Service (NTIS), Springfield, VA 22161, USA.

CFR publications are available from the Superintendent of Documents, U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20013-7082, USA.

CISPR documents are available from the International Electrotechnical Commission, 3, rue de Varembe, Case Postale 131, CH 1211, Genève 20, Switzerland/Suisse. They are also available in the United States from the Sales Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA.

CSA publications are available from the Canadian Standards Association (Standards Sales), 178 Rexdale Blvd., Etobicoke, Ontario, Canada M9W 1R3.

ECMA publications are available from the European Computer Manufacturers Association, 114 rue du Rhône, CH-1204, Geneva, Switzerland/Suisse.

EGSA publications are available from the Electrical Generating Systems Association, 10251 W. Sample d., Suite B, Coral Springs, FL 33065, USA.

EIA publications are available from Global Engineering, 1990 M Street NW, Suite 400, Washington, DC, IPS publications are available from the National Technical Information Service (NTIS), U. S. Dept. of Commerce, 5285 Port Royal Rd., Springfield, VA 22161.

ICEA publications are available from ICEA, P.O. Box 411, South Yarmouth, MA 02664, USA.

ICRU publications are available from the National Council on Radiation Protection and Measurements, 7910 Woodmont Avenue, Suite 800, Bethesda, MD 20814, USA.

IEC publications are available from IEC Sales Department, Case Postale 131, 3, rue de Varembe, CH-1211, benève 20, Switzerland/Suisse. IEC publications are also available in the United States from the Sales

Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA.

IEEE publications are available from the Institute of Electrical and Electronics Engineers, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, USA.

Internet Requests for Comments (RFCs) are available from the DDN Network Information Center, SRI International, Menlo Park, CA 94025 USA. They are also available on the World Wide Web at the following URL: <http://www.internic.net/ds/rfc-index.html>

IPC publications are available from the Institute for Interconnecting and Packaging Electronic Circuits (IPC), 7380 N. Lincoln Ave., Lincolnwood, IL 60646.

ISO publications are available from the ISO Central Secretariat, Case Postale 56, 1 rue de Varembe, CH-1211, Genève 20, Switzerland/Suisse. ISO publications are also available in the United States from the Sales Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA.

JEDEC publications are available from JEDEC, 2001 I Street NW, Washington, DC 20006, USA.

MIL publications are available from Customer Service, Defense Printing Service, 700 Robbins Ave., Bldg. 4D, Philadelphia, PA 19111-5094.

NASA publications are available from NASA Center for Aerospace Information (CASI), ATTN: Document Orders, 800 Elkridge Landing Rd., Linthicum Heights, MD 21090-2934.

NBS publications are available from the Superintendent of Documents, U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20013-7082, USA.

NCRP publications are available from the National Council on Radiation Protection and Measurements, 7910 Woodmont Avenue, Suite 800, Bethesda, MD 20814, USA.

NEMA publications are available from the National Electrical Manufacturers Association, 1300 N. 17th St., Ste. 1847, Rosslyn, VA 22209, USA.

NFPA publications are available from Publications Sales, National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101, USA.

UL standards are available from Global Engineering, 1990 M Street NW, Suite 400, Washington, DC, 20036, USA.

US Regulatory Guides are available from the Superintendent of Documents, US Government Printing Office, P.O. Box 37082, Washington, DC 20013-7082, USA.

This authorized standards project was not approved by the IEEE Standards Board at the time this went to press. It is available from the IEEE Service Center. [NOTE: the reference must include the P-number, title, revision number, and date.]

ANSI XXX-19XX has been withdrawn; however, copies can be obtained from the Sales Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA.

The numbers in brackets, when preceded by the letter B, correspond to those in the bibliography in Section XX.

The numbers in brackets correspond to those of the references in XX.

IEEE Std XXX-19XX has been withdrawn; however, copies can be obtained from the IEEE Standards Department, IEEE Service Center, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, USA.

As this standard goes to press, IEEE Std SSS-199X is not yet published. It is, however, available in manuscript form from the IEEE Standards Department, (908) 562-3800. Anticipated publication date is XXX 199X, at which point IEEE Std XXX-199X will be available from the IEEE Service Center, 1-800-678-4333.

This standard will be available from the Institute of Electrical and Electronics Engineers, Service Center, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, USA, in early 199X.

Approved 1394TA documents can be ordered through: 1394 Trade Association, 221 West Sixth Street, Suite 1520, Austin, TX 78701; by contacting [taadmin@1394TA.org](mailto:taadmin@1394TA.org); or by fetching a pdf copy from the 1394TA web site: <http://www.1394TA.org/abouttech/specifications/techspec.html>.

## **F.2 IEEE cover pages**

Cover pages for IEEE documents are provided in the remainder of this annex. When editing IEEE specifications, these pages should be moved to the front of the document.

**IEEE PXXXX/Draft #**  
**Date**

# Draft Standard ...

Sponsor:  
**Committee of the IEEE Society**

**Abstract:**

**Keywords:**

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## Introduction

(This introduction is not part of IEEE Std xx-200X, title.)

At the time this standard was completed, the working group had the following membership:

**name**, *Chair*

**name**, *Secretary*

To Be Supplied By IEEE Staff.

etc.

etc.

The following members of the balloting committee voted on this standard. Balloters may have voted for approval, disapproval, or abstention.

To Be Supplied By IEEE Staff.

etc.

etc.

When the IEEE-SA Standards Board approved this standard on XX Month 200X, it had the following membership:

**name**, *Chair*  
**name**, *Vice Chair*  
**Judith Gorman**, *Secretary*

To Be Supplied By IEEE Staff.                      etc.    etc.

\*Member Emeritus

Also included is the following nonvoting IEEE-SA Standards Board liaisons:

Satish K. Aggarwal, *NRC Representative*  
Alan H. Cookson, *NIST Representative*  
Donald R. Volzka, *TAB Representative*

Editor's name here  
*IEEE Standards Project Editor*



## Annex G

(informative)

### C-code illustrations

**Editors' Notes:** To be removed prior to final publication.

References:

None

Definitions:

None.

Abbreviations:

None.

Revision History:

Draft 0.1, February 2002

Initial draft document for WG review.

Draft 0.2, April 2002

Draft 0.2 for WG review.

Draft 0.3, June 2002

Draft 0.3 for WG review, modified per comments on D0.2.

This Annex provides code examples that illustrate the computation of the CRC, the MAC data path, and the RPR fairness algorithm. The code in this Annex is purely for informational purposes, and should not be construed as mandating any particular implementation. In the event of a conflict between the contents of this Annex and another normative portion of this standard, the other normative portion shall take precedence.

The syntax used for the following code examples conforms to ANSI X3T9-1995.

**Editors' Notes:** To be removed prior to final publication.

The code style and format are not yet finalized. In addition, the proper reference for the ANSI C standard should be provided.

```

// *****
// The following illustrate how code can be presented in a landscape fashion
//
//          1          2          3          4          5          6          7          8          9          0          1          2          3
//2345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012
//
#include <assert.h>
#include <stdio.h>

typedef unsigned char    uInt1;    // 1-byte unsigned integer
typedef unsigned short  uInt2;    // 2-byte unsigned integer
typedef unsigned int    uInt4;    // 4-byte unsigned integer
typedef unsigned long long uInt8;  // 8-byte unsigned integer

typedef signed char     sInt1;    // 1-byte signed integer
typedef signed short    sInt2;    // 2-byte signed integer
typedef signed int      sInt4;    // 4-byte signed integer
typedef signed long long sInt8;   // 8-byte signed integer

// Illustrations of useful ASCII-art comments follow
//
// Ethernet packet format:
// +-----+
// |          |1|m|          destinationMacAddress          |
// +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
// |          |1|m|          sourceMacAddress          |
// +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
// |          vlanCode          | pri |c|          vlanIdentifier          |          typeCode          |
// +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
// |version| ihl |
// +-----+-----+
//
// IP-V4 packet format
// +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
// //h2|          vlanCode          | pri |c|          vlanIdentifier          |          typeCode          |-----+-----+-----+-----+
// +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
// //h3|version| ihl | pre |D|T|R|C|r|          totalLength          |          identification          | fls |          fragmentOffset          |
// +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
// //h4| timeToLive          | protocol          |          headerChecksum          |          sourceIpAddress          |
// +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
// //h5|          destinationIpAddress          |          (ipOptions)          |
// +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
// //h6|          sourcePort          |          destinationPort          |          sequenceNumber          |
// +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
// //h7|          acknowledgementNumber          | offs | reserved | bits |          window          |
// +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
// //h8|          checkSum          |          urgentPointer          |          (tcpOptions)          |
// +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
// //h9|
// |          applicationData          |
// +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
// |          checkSum          |          (extension)          |
// +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+

```



```
// IP-V6 packet format
// +-----+-----+-----+-----+-----+-----+-----+-----+
//h0|          |1|m|          destinationMacAddress          |
// +-----+-----+-----+-----+-----+-----+-----+-----+
//h1|          |1|m|          sourceMacAddress          |
// +-----+-----+-----+-----+-----+-----+-----+-----+
//h2|          vlanCode          |pri|c|          vlanIdentifier          |          typeCode          |
// +-----+-----+-----+-----+-----+-----+-----+-----+
//h3|version| trafficClass |          flowLabel          |          payloadLength          |          nextHead          |          hopLimit          |
// +-----+-----+-----+-----+-----+-----+-----+-----+
//h4|          sourceIp6AddressHi          |
// +-----+-----+-----+-----+-----+-----+-----+-----+
//h5|          sourceIp6AddressLo          |
// +-----+-----+-----+-----+-----+-----+-----+-----+
//h6|          destinationIp6AddressHi          |
// +-----+-----+-----+-----+-----+-----+-----+-----+
//h7|          destinationIp6AddressLo          |
// +-----+-----+-----+-----+-----+-----+-----+-----+
//h8|          nextHead          |          opLength          |
// +-----+-----+-----+-----+-----+-----+-----+-----+
// |          hopByHopOptionParameters          |
// |          (comes first)          |
// +-----+-----+-----+-----+-----+-----+-----+-----+
// |          nextHead          |          opLength          |
// +-----+-----+-----+-----+-----+-----+-----+-----+
// |          otherOptionParameters          |
// +-----+-----+-----+-----+-----+-----+-----+-----+
// |          nextHead          |          opLength          |
// +-----+-----+-----+-----+-----+-----+-----+-----+
// |          sourceRouteParameters          |
// +-----+-----+-----+-----+-----+-----+-----+-----+
//i0|          sourcePort          |          destinationPort          |          sequenceNumber          |
// +-----+-----+-----+-----+-----+-----+-----+-----+
//i1|          acknowledgementNumber          |          offs          |          reserved          |          bits          |          window          |
// +-----+-----+-----+-----+-----+-----+-----+-----+
//i2|          checkSum          |          urgentPointer          |          (tcpOptions)          |
// +-----+-----+-----+-----+-----+-----+-----+-----+
// |          applicationData          |
// +-----+-----+-----+-----+-----+-----+-----+-----+
// |          checkSum          |          (extension)          |
// +-----+-----+-----+-----+-----+-----+-----+-----+
```



