

**DEC
STANDARD
124
REV. A**

**FORMATS
STANDARDS
FOR
MANUALS**

**PRODUCED
ON
TYPESET
MEDIA**

TITLE: Format Standard for Manuals Produced on Typeset Media

ABSTRACT: This standard is for personnel who are involved in preparing hardware-related product literature for typeset media. It does not apply to software documentation. It must be used for any typeset manuals to be published on microfiche. This standard governs formatting procedures only.

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1.0 INTRODUCTION

1.1 Goals

The goals of the Format Standard for Manuals Produced on Typeset Media are to simplify production methods, to promote uniformity in DIGITAL hardware-related product literature in spite of decentralized writing groups, and to ensure readability for any literature distributed on microfiche. With the implementation of the format standard, the production group will have a finite specification for the format of manuals. The format standard will be used by:

1. All production groups dealing with typeset manuals published on microfiche in order to promote uniformity and readability, and
2. All hardware-related product literature produced whose major target population is field service personnel. This standard may be revised to include software-related product literature when the characteristics of the typeset system for the Software Publications group have been determined.

This document describes the standard for preparing 8-1/2 inch by 11 inch typeset-quality hardware manuals and for all manuals prepared for microfiche publishing. It adheres to the standards defined and serves as an example of nonchapter-oriented text.

In general, all manuals are to be typeset for 100 percent reproduction. Text is set 40 picas (about 6-1/2 inches) wide and 53 picas (9 inches) deep. Unless otherwise indicated, type is 11-point Times Roman on 12 points of lead. Special symbols and lines that cannot be typeset must be inserted by hand.

1.2 Scope

This standard applies to all 8-1/2 inch by 11 inch DIGITAL hardware-related product literature produced on typeset media. The standard is to be used by all production groups who publish manuals on microfiche.

It is outside the scope of this standard to define formats for:

1. Technical manuals produced via a medium other than typeset.
2. Technical manuals produced for a size other than 8-1/2 inch by 11 inch.
3. Software documentation.

2.0 TERMINOLOGY

Boilerplate - The standard set of preprinted pages included in the repro package for publication.

Boildface - A type having thick, heavy lines which give a conspicuous black impression (such as the section headings in this document).

Em - A measure equal to the square of the body type (i.e., a 10 point em is 10 points square).

Em dash - A dash whose length is the same as the square of the body type.

Em space - A horizontal space whose length is the same as the square of the body type.

En - A measure equal to half the width of an em.

Galley proof or galley - The photographic paper output from the typesetting machine.

Image area – The size of the body text area. For this standard, the image area is 40 picas (6 1/2 inches) wide and 53 picas (9 inches) deep. Page numbers are outside the image area even though they are part of the page makeup and layout.

Layout – Placement of typed or other copy in the page format to be used in reproducible copy, leaving space for illustrations and adding running heads and feet and page numbers.

Leading – The distance from the base of one line to the base of the next line. Expressed as points of leading.

Makeup – In composition, the arrangement of lines of type and illustrations into pages of proper length.

Pica – A typeset unit equal to 12 points or approximately one sixth of an inch.

Point – A unit approximately equal to 1/72 of an inch. This term can be used to refer to the size of type, as in a character is 14 points, or to a distance, as in 12 points of leading separate the heading from the text.

Point size – The number of points from slightly above the highest ascender to slightly below the lowest descender of any type.

Repro package – The set of pasted-up pages which are photographed to make printing plates or microfiche. It is shot, for reproduction proof.

Square – In typesetting, a term used to indicate identical height and width of a character related to a particular point size (i.e., a 10-point em is 10 points square, 10 points high and 10 points wide).

Times Roman – The typeface specified in the standard and used to produce the standard.

Top blue line – The line on the repro paper indicating the top of the image area.

11 point on 12 points – Text set in 11 point type with an additional 1 point of lead added between lines. This makes the distance from baseline to baseline 12 points.

3.0 CONFORMANCE

All new hardware-related product literature produced on typeset media and all typeset manuals prepared for publication on microfiche must follow this standard as closely as possible. Under some circumstances, typographical exceptions may be necessary because of cost constraints or equipment limitations. The standard will be reviewed every six months by personnel involved in preparing manuals to determine the feasibility of conforming to the standard.

In addition, the paste-up of galleys for reproduction requires judgement on the part of the illustrators. To fit copy into a certain area or format may require deviations from the leading specified in the standard. These deviations are to be expected and will not detract from the professional appearance of the document.

4.0 FORMAT OF THE TYPESETTING STANDARD

The following paragraphs define the specifications that comprise this typesetting standard.

4.1 Title and Copyright Pages

4.1.1 Title Page – The standard boilerplate must be used for the title page. The title is set in 24-point Univers boldface, initial caps, on 26 points of lead for title pages of manuals without die-cut covers. For manuals with die-cut covers, the title must be the largest point size possible to accommodate the die-cut, up to a maximum of 18 points on 20 points of lead.

4.1.2 Copyright Page – The standard boilerplate applicable to the product line and to the location of the development (e.g., non-U.S. development) must be used for the copyright page.

4.2 Table of Contents

Any manual with more than 1 chapter or with more than 10 headings requires a table of contents.

The table of contents is set in 11-point Times Roman on 12 points of lead, 46 picas wide.

The title CONTENTS, set in 14-point Times Roman boldface caps, is centered below the top blue line on the repro paper. The column heading Page (flush right) is set in 11-point boldface after 24 points of lead. Twenty-four points of lead separate the word Page from the first chapter entry.

NOTE

Leading is defined as the total distance measured from baseline to baseline; it is not merely the white space appearing between the lines of text. This documentation standard uses the word separate (as in 24 points of lead separate) to indicate the distance from baseline to baseline.

The table of contents contains entries for all headings in the order that they appear in the manual: chapter titles, paragraph headings, appendixes, and lists of figures and tables. Paragraph numbers are flush left. Chapter and first level paragraph titles are left-aligned 7 picas from the margin. Second level paragraph titles are indented 9 picas. Third level paragraph titles are indented 11 picas. Page numbers are flush right; they are separated from the paragraph title by leaders.

Chapter numbers and titles are boldface caps. Page numbers are not listed for chapter heads. First level paragraph titles are medium face caps. Second and third level heads are set in medium face initial caps.

Twenty-four points of lead separate the entries of one chapter from the beginning of the next chapter.

Figures and tables are listed separately. The word FIGURES is centered in 14-point boldface caps, after 36 points of lead. Twenty-four points of lead separate the word FIGURES from the headings. The headings Figure No., Title, and Page are set in 11-point boldface, flush left, centered, and flush right, respectively. The figure numbers, titles, and page numbers are set in 11-point medium. Figure numbers are set flush left, and page numbers are set flush right, separated from the title by leaders. Figure titles are set in initial caps, indented 7 picas from the margin.

The frontispiece is not listed in the table of contents.

There are 36 points of lead between the last entry under FIGURES and the word TABLES. Tables are formatted in the same manner as figures.

When the Table of Contents is longer than 1 page, continuation is indicated at the top of each continued page; the abbreviation (CONT) follows the title CONTENTS. The column heading Page is also repeated on each continued page. Contents pages are numbered in consecutive order (starting with iii) using lowercase Roman numerals.

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4.3 Preface

If the manual is chapter oriented, the preface appears on the first right-hand page following the table of contents pages. The title PREFACE is flush right 3 picas below the top blue line on the repro paper in 14-point boldface caps. There are 72 points of lead between the word PREFACE and the beginning of the text.

4.4 Chapters

Each chapter begins on a right-hand page. The number and title of a chapter are set on two lines, each right justified. The first begins 3 picas below the top blue line on the repro paper and contains the word CHAPTER and the chapter number (e.g., CHAPTER 3) in 14-point Times Roman boldface caps. The next line contains the chapter title in 14-point Times Roman boldface caps. Sixteen points of lead separate the first line from the second, and 72 points separate the second from the beginning of the text.

4.5 Paragraphs

Paragraphs are set flush left and right in 11-point Times Roman with 12 points of lead in a 40-pica measure. If the manual is to be set in a 2-column format, each column is 19 picas wide. A 2-pica gutter separates the columns. Unless otherwise indicated, all 2-column typesetting specifications are the same as full measure formats.

4.5.1 Paragraph Headings – Each paragraph title is preceded by a number (containing one or more periods) which identifies the paragraph. One em space separates the entire number from the title. Twelve points of lead separate the paragraph heading from the text (except for third-level headings; see below). Twenty-four points of lead separate each paragraph under the heading. Twenty-four points of lead separate the end of a paragraph from the heading of the next paragraph.

NOTE

If a heading appears without associated text, 24 points of lead separate the first heading from the second.

There are three levels of headings; numbering beyond the third level should be avoided.

1. **FIRST LEVEL** – 11-point boldface, caps
2. **Second Level** – 11-point boldface, initial caps
3. **Third Level** – 11-point boldface, initial caps, run in. That is, the heading is followed by a space, an en dash, and a space; then the text begins on the same line. The dash is also in boldface.

If a fourth- or lower-level heading is used, it is formatted in the same manner as the third-level heading.

4.5.2 Headings for Nonchapter-Oriented Manuals - One exception to the numbering rules for numbering paragraphs is the following:

Any short, nonchapter-oriented manuals (such as this typeset standard document) are numbered as follows:

1.0 FIRST LEVEL HEADING*

1.1 Second Level Heading

1.1.1 Third Level Heading - Text begins here.

4.6 Lists

The order of elements in a primary list is indicated by numbering, left indented 2 picas, multiple digit numbers, e.g., 10, 11, etc. are right aligned. All numbers are followed by a period. The text of a primary list is indented an additional 2 picas from the left margin (4-pica indent).

The order of elements in a secondary list is indicated by lowercase letters, left indented 4 picas and followed by a period. Text of a secondary list is indented an additional 2 picas from the left margin (6-pica indent).

In all lists the text is blocked and does not flow under the identifying number or letter.

Twelve points of lead separate elements within a list when all elements are single lines; twenty-four points separate the elements when one or more has multiple lines. Twenty-four points separate the list from preceding and following text. See page 16 of this standard for an example of a primary list.

4.7 Examples

Twenty-four points of lead separate an example from the preceding and following text. All examples are indented 2 picas.

4.8 Notes

Notes, cautions, and warnings are set in boldface and appear under the text to which they apply, separated by 24 points of lead. In a 40-pica measure, notes are indented 10 picas from each side. In a 19-pica measure, notes are not indented. The word note, warning, or caution is 11 point boldface caps centered after 24 points of lead. Twelve points of lead separate the word note, caution, or warning from the text associated with it. Twenty-four points of lead separate the last line of the note, caution, or warning from the subsequent text.

4.9 Footnotes

Footnotes are set in 10 point on 11 points of lead and are 40 (or 19, depending on format) picas wide. They are placed under a rule 9 picas wide drawn with a 0 or 1 technical pen. The minimum distance between the body of the text and the rule is 24 points. Eleven points of lead separate the rule from the first footnote and separate each footnote on the page. On a short page of text, the footnotes are placed at the bottom of the page (not immediately following the text).

All footnotes must be included within the image area. The complete text of a footnote should appear on the page containing the item to which the footnote refers. (Footnotes should not be continued on following pages.)

*Note that a heading identified by a n.0 number is used only in nonchapter-oriented manuals.

4.10 Tables and Figures

For chapter-oriented manuals, tables and figures are centered on the page and are numbered consecutively within each chapter (e.g., Figure 3-8, Table 3-8). For program-oriented manuals, tables and figures are numbered independently in sequential order (e.g., Table 1, Figure 1, Table 4).

4.10.1 Tables – The text of a table is 11-point Times Roman on 12-point lead and is 90 picas wide (maximum). The columns are left and right justified where practical.

The table title is set on one line centered above the table. This line contains the word *Table*, the table number, and the table name in 11-point boldface, initial caps. The table number and title are separated by an em space. For example:

Table 1-1 Error Messages

If the table title is too long to fit on one line, it is continued on the next line centered under the first line.

Twenty-four points of lead separate the preceding text and the table number and title. Also, 24 points of lead separate the table number and name and the column headings of the table. Column headings are flush left over each column of the table in 10-point boldface, initial caps and are generated from the table text by 24 points of lead. Twenty-four points of lead separate the end of the table from the following text.

Horizontal lines are required at the beginning and the ending of tables. Additional lining in tables is optional.

If a table is one page or less in length, it should not be split across two pages. When a table is longer than one page, the table number, name, and column headings are repeated on continuation pages. The abbreviation (Cont.) follows the table name. For example:

Table 1-1 Error Messages, Cont.

4.10.2 Figures – The number and title of a figure are set on one line centered below the figure. The caption should be no wider than the figure. For captions that fall on the fold of a layout figure, the measure is 20 picas (maximum). Twenty-four points of lead separate the figure title from the following text. A minimum of 24 points of lead separate the highest part of the figure from the preceding text. The figure number and title are 11-point medium face initial caps. If the figure title is two lines, the second line is centered under the first line. If a caption is three or more lines, it is set flush left.

If a figure is one page or less in length, it should not be split across two pages. When a figure is longer than one page, continuation is indicated as follows:

Figure 1-1 Title (Sheet 1 of 2)

The artwork or photograph number should appear with the figure.

4.11 Indexes

The index is double column, the same point size and leading as the document (11, 12). Each column is 19 picas wide. A 2-pica gutter separates the columns. The word **INDEX** is 14-point boldface caps and centered 3 picas below the top blue line on the repro paper. Thirty-six points of lead separate the heading from the text and 24 points of lead separate the sections (between A, B, etc.). The page numbers are 11-point, medium face caps, e.g., INDEX-1, INDEX-2, and are centered at the bottom of the page, 3 picas below the image area.

Each major item in the index should be initial caps; subheadings should not be capitalized unless they are signal names, commands, or programs such as FILEV or programming languages such as FORTRAN.

Sample:

```
Editor options, (en space) 1-2, 1-3
(en space) automatic overflow, (en space) 1-2, 1-3
```

Continued lines should be indented 2 em spaces. An example of an index is shown at the end of this manual.

4.12 Page Numbering

4.12.1 Chapter-Oriented Manuals – Pages of a chapter-oriented manual are numbered using the chapter number-page number format (1-2, 2-5, etc.) Page numbers are 11-point medium face and are centered at the bottom of the page, 3 picas below the image area.

4.12.2 Nonchapter-Oriented Manuals – Pages of nonchapter-oriented manuals are numbered sequentially (i.e., 1, 2, 3, etc.) in the format described above.

4.12.3 Pre- and Post-Chapter Material – The contents and preface pages of chapter-oriented manuals are numbered using lowercase consecutive Roman numerals placed according to the format above. No numerals appear on the title and copyright pages, although they are included in the count. Appendices of chapter-oriented manuals are numbered using the letter of the appendix (i.e., A-1, A-2, etc.).

4.13 Sample Chapter-Oriented Text

An example of these standards applied to a chapter-oriented manual follows.

CHAPTER 1 INTRODUCTION

1.1 SCOPE

This manual provides a complete description of the DUVII Line Interface including installation, theory of operation, programming and maintenance. The material is presented with the understanding that the reader is familiar with basic digital computer theory.

This chapter contains introductory information. Data communication techniques and systems are discussed. The DUVII is presented in terms of its general and physical description and specifications. Also, an explanation of engineering drawing conventions is provided.

1.2 DATA COMMUNICATION TECHNIQUES

There are several techniques used for the transfer of data communication signals. Each has its particular advantages and disadvantages.

1.2.1 Pulse Coding

Standard data communication messages are sent in some form of pulse code. There are several varieties of pulse codes used in the transferral of data in digital form. Binary signals, by their very nature, are natural elements for digital data codes. Such codes are said to be in binary format.

A formatted binary code can represent different symbols only by allowing sufficient binary elements for each symbol. If we think of one binary digit (or bit) representing each symbol, we have only two choices: one symbol represented by the on state, the other represented by the off state. With such an arrangement, we could let the on or one state represent no and the off or zero state represent yes. While it would be difficult with such an arrangement, we could convey messages of a very limited nature from a remote station (such as the answer to "Is the temperature at your station over 70° F?").

If, instead of using one binary digit for our character, we use two, we have more characters to choose from. Our choice for a 1-bit code was limited to two: 0 or 1. Our choice for a 2-bit code is four: 00, 01, 10, or 11. If we choose a 3-bit code, our choice is eight: 000, 001, 010, 011, 100, 101, 110, and 111. It can be shown that for a code with a character makeup of n bits, the number of characters available will be 2^n .

In communications parlance, instead of calling these codes 1-bit codes, 2-bit codes, etc., they are called 1-level codes, 2-level codes, etc. Although any arbitrary meaning can be assigned to a code character, it is more practical for the majority of operations to let the characters represent numbers, punctuation marks, spaces, and letters of the alphabet. In addition to these, some special codes use characters for other meanings.

1.2.2 Pulse Code Transmission

In order to transmit code characters, it is necessary to arrange their elements in a way that will allow their reception without uncertainty.

There are two basic techniques of serial data transmission: asynchronous and synchronous. These two techniques, as well as a third, isochronous, will be discussed in the following paragraphs.

1.2.2.1 Asynchronous Serial Transmission - This technique enables data to be transferred as it becomes available. This is possible by framing each data character with a begin signal (START bit) and an end signal (STOP bit), so that the equipment receiving the data (the interface receiver) knows when a data character is being presented on the communication line and when the line is inactive.

Hence, each character consists of three parts: a START bit, the data bits, and a STOP bit (Figure 1-1). A START bit is a line state (usually a zero) that lasts for 1 bit time. The data bits represent the actual binary character being transferred. In many applications the characters are 8 bits long with the least significant bit being sent out and received first. A STOP bit is a line state (usually a one) that lasts for 1, 1.42, or 2 bit times; it indicates that character transmission is complete. The STOP bit enables the interface receiver to check synchronization after each character transmission. If the STOP bit is not received properly, i.e., it is not presented on the line immediately after the last data bit, the character received is considered erroneous and retransmission is necessary.



Figure 1-1 Asynchronous Technique Format

Clocking for the interface transmitter and interface receiver during asynchronous transmission is provided by two different sources that are asynchronous to one another. The transmitter clock is enabled when data is available for transmission and clocks the character onto the line. The receiver clock is enabled when a START bit is detected on the line and samples the data bits as they are presented on the line. The receiver is also equipped with a counter that counts the character bits received. When a complete character and a STOP bit are received (the receiver must know the number of bits per character), the receiver clock is disabled until the next START bit is detected.

The asynchronous serial data transmission technique has the following advantages:

1. Can be generated easily by electromechanical equipment (e.g., Teletype* keyboard)
2. Can be used easily to drive mechanical equipment (e.g., Teletype printers)
3. Characters can be sent asynchronously (as they become available) because each character has its own synchronizing information.

The disadvantages of the asynchronous serial transmission technique are:

1. Separate timing is required for both transmitter and receiver.
2. It is distortion sensitive because the receiver depends on incoming signal sequences to become synchronized. Any distortion in these sequences will affect the reliability with which the character is assembled.

*Teletype is a registered trademark of Teletype Corporation

- Speed is limited because a reasonable margin between characters must be built-in to accommodate distortion.
- It is inefficient because at least 10 bit times are required to send 8 bits of data. If a 2 bit time STOP bit is used, it takes 11 bit times to transfer 8 bits of data.

1.2.2.2 Synchronous Serial Transmission - This technique does not use START and STOP bits to accomplish synchronization. Instead, the entire block of data (message) is preceded on the line by a synchronizing code. When the interface receiver recognizes this code (henceforth referred to as sync characters), it locks in and, using a counter, assembles the data characters which follow. Hence, as in the asynchronous technique, the receiver must know the number of bits per character.

This technique requires that the clock for the interface transmitter be identical to the clock used at the receiver. The clock signal is provided to the transmitter and receiver on lines separate from the data line. At the transmitter, the clock signal serves to clock the data onto the line. At the receiver, the clock signal gates the data in. Figure 1-2 illustrates the timing for a synchronous communication system using modems.



Figure 1-2 Synchronous Format

As shown in Figure 1-2, the modem provides the clock, the transmitter presents the data to the line on the positive going edge of the clock, and the receiver samples the data on the negative going edge. If the transmitter pauses at any time and fails to inhibit the clock, the receiver will continue to sample the line, synchronization is lost, and the remainder of the message will be erroneous.

The advantages of the synchronous serial data transmission technique are:

- Modem timing sources can be used for both transmitter and receiver.
- If modem timing is used, interface receiver does not require clock-synchronizing logic as does the asynchronous technique.
- It is highly efficient because there are no bit times wasted with the use of START and STOP bits. All bits on the line are data with the exception of the sync characters at the beginning of the bit stream.
- Low distortion sensitivity because the timing is provided along with the data.
- Higher speeds are achievable because of the low distortion sensitivity.

The disadvantages of the synchronous serial data transmission technique are:

- Characters must be sent synchronously, not asynchronously (asynchronous transmission is desirable for most real-time and mechanical applications).

2. One bit time added to or missing from the data bit stream can cause the entire message to be faulty.
3. The computer carrier equipment required to accommodate this mode of operation is more expensive than the equipment required for asynchronous modes of operation.
4. Mechanical equipment cannot transmit or receive this format directly.

1.2.2.3 Isochronous Serial Transmission - This technique is essentially the transmission of asynchronous data over a synchronous modem. Character synchronization is achieved via START and STOP bits; a common timing source is used for both the transmitter and receiver.

The isochronous technique does have advantages over the asynchronous technique. Clocking for isochronous operations emanates from the modems and is synchronous to the data; hence, the receiver does not require clock-synchronizing logic and distortion sensitivity is low, making higher speeds possible.

1.3 COMMUNICATION SYSTEMS

1.3.1 Synchronous Systems - Synchronous modulator-demodulators (modems) have permitted a higher rate of data transmission than asynchronous modems over a voice grade facility. The nature of these transmission techniques has also resulted in higher efficiency by eliminating the need for synchronizing information with every character.

Most synchronous modems supply all the timing necessary to receive each bit as it is made available from the modem. The difficulty in designing a synchronous modem interface is to design the capability of communicating in the message format used in synchronous communications.

Table 1-1 Representative Message Codes

Character	Meaning	Function
**SYN	Synchronizing signal	Establish character framing
**SOH	Start of heading signal	Precedes block message heading characters
**STX	Start of text signal	Precedes block of text characters
**ETX	End of text signal	Terminates a block of characters started with STX
**ACK	Acknowledge signal	* Affirmative acknowledgment of message received
**NAK	Negative acknowledge signal	* Negative acknowledgment of message received

*ACK and NAK are sent by the station that received the message to the station that originated the message.

**software protocol

It is not the purpose of this manual to discuss the format for synchronous communication in detail. However, a brief description of these formats is outlined to facilitate the reader's understanding of synchronous interface design.

Because the synchronous transmission technique provides only bit recovery timing, there must be a way to establish character framing and message framing. This is accomplished by using codes (usually ASCII) that are assigned for synchronous message formatting purposes. Representative message codes are listed in Table 1-1.

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