Consultative Committee for Space Data Systems

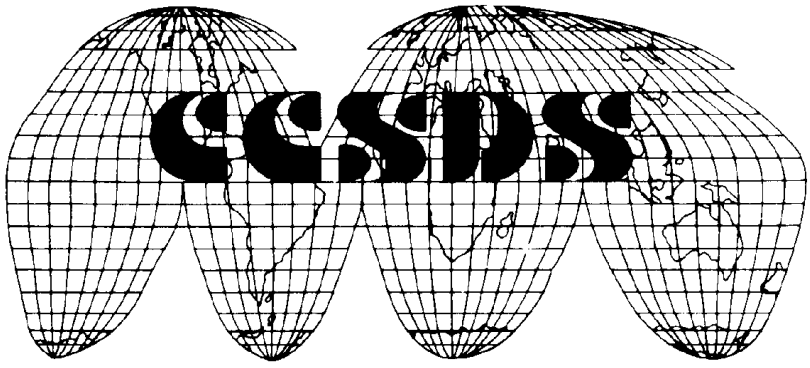
RECOMMENDATION FOR SPACE DATA SYSTEM STANDARDS

ASCII ENCODED ENGLISH (CCSD0002)

CCSDS 643.0-B-1

BLUE BOOK

November 1992



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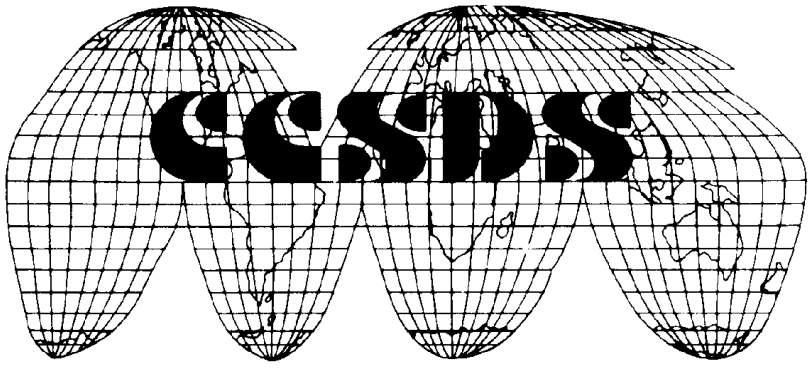

AUTHORITY

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This Recommendation reflects the consensus technical agreement of the following member Agencies of the Consultative Committee for Space Data Systems (CCSDS):

- British National Space Centre (BNSC) / United Kingdom
- Canadian Space Agency (CSA) / Canada
- Central Research Institute of Machine Building (TsNIIMash) / Russian Federation
- Centre National D'Etudes Spatiales (CNES) / France
- Deutsche Forschungsanstalt für Luft und Raumfahrt (DLR) / FRG
- European Space Agency (ESA) / Europe
- Instituto de Pesquisas Espaciais (INPE) / Brazil
- National Aeronautics and Space Administration (NASA) / USA
- National Space Development Agency of Japan (NASDA) / Japan

The following observer Agencies also concur with this Recommendation:

- Chinese Academy of Space Technology (CAST) / Peoples Republic of China
- Central Research Institute of Physics (CRIP) / Hungary
- Department of Communication, Communications Research Centre (DOC-CRC) / Canada
- Institute of Space Astronautics and Science (ISAS) / Japan

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FOREWORD

This document is a technical Recommendation for the standardisation of the use of ASCII Encoded English as a data description language for the interchange of digital space-related data in an open data system and has been prepared by the Consultative Committee for Space Data Systems (CCSDS).

This Recommendation defines the usage of ASCII Encoded English and its representation as a data description language. It allows implementing organisations within each Agency to proceed coherently with the development of compatible derived Standards for space data systems and widely dispersed data users that are within their cognisance.

Through the process of normal evolution, it is expected that expansion, deletion, or modification to this document may occur. This Recommendation is therefore subject to CCSDS document management and change control procedures which are defined in Reference [1].

Questions relating to the contents or status of this document should be addressed to the CCSDS Secretariat.

STATEMENT OF INTENT

The Consultative Committee for Space Data Systems (CCSDS) is an organisation officially established by the management of the member space Agencies. The Committee meets periodically to address data system problems that are common to all participants, and to formulate sound technical solutions to these problems. Inasmuch as participation in the CCSDS is completely voluntary, the agreements of the Committee are termed **RECOMMENDATIONS** and are not considered binding to any Agency.

This Recommendation is issued by, and represents the consensus of, the CCSDS Plenary body. Agency endorsement of the Recommendation is entirely voluntary. Endorsement, however, indicates the following understandings:

- Whenever an Agency establishes a CCSDS-related Standard, this Standard will be in accord with the relevant Recommendation. Establishing such a Standard does not preclude other provisions which an Agency may develop.

- Whenever an Agency establishes a CCSDS-related Standard, the Agency will provide other CCSDS member Agencies with the following information:

  - The Standard itself.

  - The anticipated date of initial operational capability.

  - The anticipated duration of operational service.

- Specific service arrangements shall be made via memorandum of agreement. Neither this Recommendation nor any ensuing Standard is a substitute for a memorandum of agreement.

No later than five years from its date of issuance, this Recommendation will be reviewed by the CCSDS to determine whether it should: (1) remain in effect without change; (2) be changed to reflect the impact of new technologies, new requirements, or new directions; or (3) be retired or cancelled.

DOCUMENT CONTROL

Document	*Title*	*Date*	*Status/ Remarks*
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REFERENCES

[1] "Procedures Manual for the Consultative Committee for Space Data Systems", CCSDS A00.0-Y-5.0, Yellow Book, Issue 5, Consultative Committee for Space Data Systems, May 1992.

[2] "Recommendation for Space Data System Standards: Standard Formatted Data Units -- Structure and Construction Rules", CCSDS 620.0-B-2, Blue Book, Issue 2, Consultative Committee for Space Data Systems, May 1992 or later.

[3] "Report Concerning Space Data System Standards: Standard Formatted Data Units -- A Tutorial", CCSDS 621.0-G-1, Green Book, Issue 1, Consultative Committee for Space Data Systems, May 1992 or later.

[4] "Information Technology - ISO 7-Bit Coded Character Set for Information Interchange", ISO/IEC 646:1991(E), Third Edition, International Organization for Standardization, 1991-12-15.

1 INTRODUCTION

1.1 Purpose and Scope

The purpose of this Recommendation is to establish a method by which the natural language English may be used within the Standard Formatted Data Unit (SFDU) environment (See References [2] & [3]). It is meant for cases in which a machine interpretable language is unavailable or for information that is best supplied in natural language. The digital representation of the characters used in English is also defined, so as to make the language suitable for data interchange.

1.2 Applicability

This Recommendation serves as a guideline for the development of compatible agency standards in the field of digital data interchange. The specifications in this document are to be invoked through the normal standards program of each Member Agency and are applicable, at a minimum, to those missions and services for which cross support (based on needs for open system data interchange) is anticipated.

1.3 Usage

This Recommendation specifies ASCII encoded English as a number of lines of characters. These can be directly presented to users on generic display or data presentation devices.

2 DEFINITION OF AUTHORITY AND DESCRIPTION IDENTIFIER (ADID) = CCSD0002

The language identified by the ADID = CCSD0002 is ASCII Encoded English. The character set to be used is encoded in the American Standard Code for Information Interchange (ASCII). These seven-bit codes have been incorporated into the ISO codes of the same nature (ISO 646-1991, Reference [4]) which includes other symbols and alphabets. Since the ISO code is an eight-bit code, the ASCII code is embedded in an eight-bit field in which the higher order bit is set to zero. The primary reference to be used should be ISO 646-1991. The ASCII codes are shown in Table 2-1. *(The code for each character (Char) is given in decimal (Dec), and hexadecimal (Hex)).*

The whole of the ASCII character set shown in Table 2-1 is permitted in the data that conforms to this Recommendation, although for interpretation purposes the characters shaded in Table 2-1 are ignored and should not be displayed or printed.

The use of an ASCII encoding to represent the natural language also permits the incorporation of tables and figures that can be drawn with the characters listed in Table 2-1. For these figures or tables to be presented identically to any receiver, the interpretation of the ASCII control characters (Vertical Tab, Horizontal Tab, Form Feed, Line Feed *(also known as New Line)* and Carriage Return) must be standardised. The following rules apply:

1. A new line (positioning the next displayable character to the left most displayable position and one line down) for presentation purposes is understood to occur upon encountering the following conditions:

   a. A Carriage Return, when it is not followed by a Line Feed.

   b. A Carriage Return/Line Feed pair, regardless of what follows.

   c. A Line Feed, when it is not followed by a Carriage Return.

   d. A Line Feed/Carriage Return pair, regardless of what follows.

2. A Horizontal Tab character positions the next displayable character onto the next character position that is a multiple of 8 *(i.e., character positions 8, 16, 24, 32 etc. where the left most displayable character position is 0)*.

3. A Form Feed character positions the next displayable character to the left most displayable position and down to the beginning of the next page. The definition of a page is as defined by the local device *(e.g., a new screen for a visual display unit (VDU) or a new piece of paper for a printer)*.

4. If the characteristics of the display device conflict with those of the data, for example, line lengths may be greater than those permitted by the device, then some adjustment to the layout of the data, as determined by the device, will occur. *(Note also that some devices may process or react to codes which this Recommendation specifies as being ignored for presentation purposes).*

Note: If the alignment of the displayed characters maybe significant to the understanding of the information, then a fixed space font should be used for presentation.

Char	Dec	Hex
NUL	0	00
SOH	1	01
STX	2	02
ETX	3	03
EOT	4	04
ENQ	5	05
ACK	6	06
BEL	7	07
BS	8	08
HT	9	09
LF	10	0A
VT	11	0B
FF	12	0C
CR	13	0D
SO	14	0E
SI	15	0F
DLE	16	10
DC1	17	11
DC2	18	12
DC3	19	13
DC4	20	14
NAK	21	15
SYN	22	16
ETB	23	17
CAN	24	18
EM	25	19
SUB	26	1A
ESC	27	1B
FS	28	1C
GS	29	1D
RS	30	1E
US	31	1F

Char	Dec	Hex
space	32	20
!	33	21
"	34	22
#	35	23
$	36	24
%	37	25
&	38	26
’	39	27
(	40	28
)	41	29
*****	42	2A
+	43	2B
,	44	2C
-	45	2D
.	46	2E
/	47	2F
0	48	30
1	49	31
2	50	32
3	51	33
4	52	34
5	53	35
6	54	36
7	55	37
8	56	38
9	57	39
:	58	3A
;	59	3B
<	60	3C
=	61	3D
>	62	3E
?	63	3F

Char	Dec	Hex
@	64	40
A	65	41
B	66	42
C	67	43
D	68	44
E	69	45
F	70	46
G	71	47
H	72	48
I	73	49
J	74	4A
K	75	4B
L	76	4C
M	77	4D
N	78	4E
O	79	4F
P	80	50
Q	81	51
R	82	52
S	83	53
T	84	54
U	85	55
V	86	56
W	87	57
X	88	58
Y	89	59
Z	90	5A
[	91	5B
\	92	5C
]	93	5D
^	94	5E
_	95	5F

Char	Dec	Hex
‘	96	60
a	97	61
b	98	62
c	99	63
d	100	64
e	101	65
f	102	66
g	103	67
h	104	68
i	105	69
j	106	6A
k	107	6B
l	108	6C
m	109	6D
n	110	6E
o	111	6F
p	112	70
q	113	71
r	114	72
s	115	73
t	116	74
u	117	75
v	118	76
w	119	77
x	120	78
y	121	79
z	122	7A
{	123	7B
|	124	7C
}	125	7D
~	126	7E
DEL	127	7F

Table 2-1: ASCII Encoded Character Set for ADID = CCSD0002