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Data Word and Message Formats

RATIONALE

This document has been reaffirmed to comply with the SAE 5-year Review policy.

FOREWORD

This document was developed as a supplemental standard to SAE AS15531, Digital Time Division Command/Response Multiplex Data Bus. This standard is the result of a conversion of a military document to a commercial standard. The lineage of this document is:

Chapter 11, MIL-HDBK-1553, Multiplex Applications Handbook
Section 80, MIL-HDBK-1553A, Multiplex Applications Handbook.

These documents were originally prepared under the SAE AS-1A Avionics Integration Subcommittee.

This document should be used as an aid to the development of data word and message formats for use in 16-bit data bus architectures. This document is applicable to both MIL-STD-1553B and SAE AS15531, and as such, references made internal to this document are shown as 15531/1553 to show when applicable.

This document has been updated from the previous Section 80 of MIL-HDBK-1553A as a result of suggestions and corrections recommended by users. Additionally, editorial changes and clarifying notes have been added throughout the document.

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1. SCOPE:

The emphasis in this standard is the development of data word and message formats for AS15531 or MIL-STD-1553 data bus applications. This standard is intended as a guide for the designer to identify standard data words and messages for use in avionics systems and subsystems. These standard words and messages, as well as the documentation format for interface control document (ICD) sheets, provide the basis for defining 15531/1553 systems. Also provided in this standard is the method for developing additional data word formats and messages that may be required by a particular system but are not covered by the formats provided herein. It is essential that any new word formats or message formats that are developed for a 15531/1553 application follow the fundamental guidelines established in this standard in order to ease future standardization of these words and messages. The standard word formats presented represent a composite result of studies conducted by the U.S. Army, Navy, and Air Force (see References 1, 2 and 3, respectively).

1.1 References:

1. MIL-STD-1553 Data Word Standardization Technical Report, STR- DD-81273-1, SEMCOR, September 1981, U.S. Army Avionics R&D Activity, Contract No. DAAK80-79-C-0258.

2. AAAS Multiplex Armament Data Word Standardization Study, 4092 TM-81 BASIC -006, SEMCOR, February 1981, Naval Air Development Center, Contract No. N62269-78-C-0302.

3. MIL-STD-1553 Multiplex Data Bus Word Format Study, Boeing Military Airplane Company, October 1981, USAF/ASD Contract No. F33615-80-C-0124.

In accordance with Public Law 94-168, Metric Conversion Act of 1975, and Department of Defense (DOD) Directive 4120.18, Use of Metric System of Measurement, metric units are preferred for use in new systems. (Reference National Aerospace Standard NAS10001, Preferred Metric Units for Aerospace, which lists the preferred metric units and conversion factors for a number of commonly used quantities in the aerospace industry.) However, when the use of metric units is not practical, the English units presented in this document may be used.

The necessity for standardizing data word and message formats became evident as more and more subsystems provided 15531/1553 interfaces as the basic input and output communication interface. Without coordination of these interfaces, outputs from a subsystem were incompatible with the input requirements of the interfacing subsystem. When new 15531/1553 hardware and systems are designed, the system designer is responsible for identifying the interface requirements of all devices and establishing compatible words and messages for proper communications. Naturally, this is accomplished during the early system development phases and is then reflected in future procurement specifications for the subsystem elements of the design. This method provides an integrated system that meets all the individual communication requirements. However, as more 15531/1553 systems are developed, this approach may result in subsystems that are incapable of exchanging data because of word and message formatting differences, even though the units meet all the requirements of 15531/1553 and their individual procurement specifications. In this case, the system designer is faced with the choice of using additional processing equipment to translate words and messages from one subsystem to another or modifying the off-the-shelf hardware to achieve integration.

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1.1 (Continued):

Usually the job of data manipulation falls on the bus controller-processor. Messages from each subsystem must be transmitted to the bus controller (RT to bus controller), which constructs new words with the appropriate engineering units, scaling, encoding, bit positions, etc., before retransmission (bus controller to RT) to the subsystem requiring the data. Word order is another message inconsistency that must be resolved. The solution to this problem does not lie in bus controller manipulation or in subsystem modifications; it lies in establishing common usage word formats and common usage output message formats to provide a subsystem designer the information required to build compatible communication interfaces.

This standard is subdivided to allow easy access when selecting the appropriate word or message format from the standards available. For signals that do not fit the standard word formats available, guidelines are provided for establishing the appropriate word format. Common signal naming practices and an ICD presentation format are provided. Some of the key benefits gained by use of the principles presented in this standard will be (1) subsystem word format definition, (2) common signal naming practices, and (3) standardization of ICD format across programs. The guidelines required for developing message formats and an ICD presentation format are also provided.

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2. WORD FORMATS:

A word format is the structure, order, and value represented by the bits in a signal data transmission. To properly define a data word format requires knowledge concerning the signal, the 15531/1553 application, and the coding technique used to communicate the information. All of these elements are discussed in the following paragraphs.

The general rules for 15531/1553 word construction (paragraph 2.2) apply to all data words whether standard or nonstandard. These rules are to be followed in the development of words that do not fit the formats listed in the standard word tables (paragraph 2.5). The procedures on how to construct a data word format described in paragraph 2.3 also apply to any data word whether or not it is eventually determined to fit a standard format. Paragraph 2.1 describes the standardized ICD presentation format that should be used for all 15531/1553 words.

2.1 Interface Control Document Signal Presentation Format:

The ICD format required for the documentation of all words in a 15531/1553 system is shown in Tables I and II. Presentation formats are provided for single word (Table I) and double precision (Table II). Signals that require more than two words should use the single word format with the number of words indicated in the REMARKS section (e.g., "3 word quantity-word 1 of 3") of the word format presentation sheet. The ICD presentation sheet entries are discussed in the following paragraph.

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TABLE I - Presentation Format, Single Word

DOC. NO. REV.
DATE
SHEET 1 OF

WORD NAME :

WORD ID	:	MAX VALUE	:
SOURCE(S)	:	MIN VALUE	:
DEST(S)	:	RESOLUTION	:
COMP RATE	:	ACCURACY	:
XMIT RATE	:	MSB	:
SIGNAL TYPE	:	LSB	:
UNITS	:	FULLSCALE	:

FIELD NAME	BIT NO.	DESCRIPTION
	-00-	
	-01-	
	-02-	
	-03-	
	-04-	
	-05-	
	-06-	
	-07-	
	-08-	
	-09-	
	-10-	
	-11-	
	-12-	
	-13-	
	-14-	
	-15-	

REMARKS:

See notes to Tables I and II

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TABLE II - Presentation Format, Double Precision

DOC. NO. REV.
DATE
SHEET 1 OF

WORD NAME :

WORD ID	:	MAX VALUE	:
SOURCE(S)	:	MIN VALUE	:
DEST(S)	:	RESOLUTION	:
COMP RATE	:	ACCURACY	:
XMIT RATE	:	MSB	:
SIGNAL TYPE	:	LSB	:
UNITS	:	FULLSCALE	:

FIELD NAME	BIT NO.	DESCRIPTION
	MSW -00-	
	-01-	
	-02-	
	-03-	
	-04-	
	-05-	
	-06-	
	-07-	
	-08-	
	-09-	
	-10-	
	-11-	
	-12-	
	-13-	
	-14-	
	-15-	
	LSW -00-	
	-01-	
	-02-	
	-03-	
	-04-	
	-05-	
	-06-	
	-07-	
	-08-	
	-09-	
	-10-	
	-11-	
	-12-	
	-13-	
	-14-	
	-15-	

REMARKS:
See notes to Tables I and II.

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Notes to Tables I and II:

Tables I and II are the skeleton ICD sheets. Figures 1 and 2 provide the detailed layout for the ICD presentation sheets. The definition of each entry is as follows:

DOC. NO.: The interface control document number.

REV.: The revision symbol for this sheet.

DATE: The calendar date of the latest revision to this sheet.

SHEET 1 OF ##: This sheet count allows multiple sheets.

WORD NAME: The formal name selected for this word as described in paragraph 2.4, Naming.

WORD ID: Code identifying the message of which this word is part. The WORD ID is constructed as follows:

XXXXSX-YYYYSY-W# or XXXXSX-YYYYSY-W#/W#, where:

XXXX = Transmitting terminal name (see Table III for examples). Transmitting terminal has T/R bit = 1.

SX = Transmitting terminal 15531/1553 subaddress from which the word originated.

YYYY = Receiving terminal name (see TABLE III for examples). Receiving terminal has T/R bit = 0.

SY = Receiving terminal 15531/1553 subaddress to which the word is addressed.

W# = Word number of single word.

W#/W# = Word numbers of double word (i.e. 12/13).

Note that the XXXXSX-YYYYSY section of the Word ID is the Message ID. The rules for Message ID construction are:

Entries in XXXX and YYYY are four characters left-justified with trailing blanks (such as "INS1", "SMS ", "MC "). In the broadcast mode of operation, YYYY is "ALL ".

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Notes to Tables I and II (continued):

Entries in SX and SY are two numeric characters with a range of 01-30 or the characters BC, M0, or M1. The latter characters are used in conjunction with the bus controller and the transmission of 15531/1553 mode codes. M0 represents the transmission of 00000 in the subaddress/mode field of the 15531/1553 command word; M1 represents the transmission of 11111 in that field.

When M0 and M1 are used as either SX or SY, the numeric entry, used in conjunction with the receive/ transmit terminal, will indicate the 15531/1553 mode code (the data word count/mode code field of the 15531/1553 command word). For example, the word ID INS 03-BC1 M0-MCCW indicates that a Mode Command Without Data Word (MCCW), is being commanded by the bus controller (BC1), using 00000 (M0) as the subaddress/mode, to the INS. The mode code being transmitted is Initiate Self Test (03)(See Tables LXVI through LXVIII for the relationship between mode codes and word/message ID formats).

Entries in W# are two numeric characters with a range of 01-32. The field W#/W# is a five- character field. If the word is single precision, the last three characters will be blank. In the case of command words, this field will contain:

RCW - BC-to-RT Transfer
TCW - RT-to-BC Transfer
RTCW - RT-to-RT Transfer
MCCW - Mode Command Without Data Word
MCCDT - Mode Command With Data Word (Transmit)
MCCDR - Mode Command With Data Word (Receive)
BCCW - BC-to-RT Transfer, Broadcast
BCCRT - RT-to-RT Transfer, Broadcast
BCMC - Mode Command Without Data Word, Broadcast
BCMCD - Mode Command With Data Word, Broadcast

In the case of status words, this field will contain:

TSW - Transmit Status Word
RSW - Receive Status Word

Examples of typical WORD ID's are shown in Table IV.

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Notes to Tables I and II (continued):

SOURCE(S):	Name(s) of the subsystem(s) originating the word, usually abbreviated or an acronym. When a word is modified by a subsystem, that subsystem becomes the originating source. Source information is used to allow tracking of data from the originating source to all destinations.
DEST(S):	Name(s) of the subsystem(s) that will receive the word, usually abbreviated or an acronym. Destination information is used to allow tracking of data back to the originating source and to other destinations.
COMP RATE:	The rate in times per second (Hz) that the data is computed.
XMIT RATE:	The nominal rate in times per second (Hz) that the message is transmitted.
SIGNAL TYPE:	2's complement -- A representation of a signed value where the negative codes are generated by adding one to the complement of the number. The use of 2's complement in a digital computer facilitates the subtraction process. Unsigned numeric -- A binary representation of an unsigned value. The value may be an integer or may have a fractional component. Discrete -- A single binary bit whose state of one or zero has a specified meaning. Coded -- A grouping of bits in which the pattern of ones and zeros has a specified meaning. Binary Coded Decimal(BCD) -- The natural binary coded decimal (NBCD) or four-bit (8421) code is a special BCD form. The NBCD code allows only 10 (0-9) valid states, with the values 10-15 being invalid. ASCII -- A seven-bit binary code representing alpha and numeric characters. ASCII-8 -- Extended ASCII using eight bits for additional character representations (show Signal Type as “ASCII”).

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Notes to Tables I and II (continued):

UNITS:	The engineering units of the transmitted signal. Note: Some words may be unitless, wherein the text in the UNITS field should be left blank or shown as “N/A”.
MAX VALUE:	The maximum value that the signal, as supplied by the subsystem, can attain. MAX VALUE must be less than or equal to FULLSCALE.*
MIN VALUE:	The minimum value that the signal, as supplied by the subsystem, can attain.*
RESOLUTION:	Resolution is defined as the minimum detectable change in value of the signal, as supplied by the subsystem; its value should be expressed to the number of places necessary to achieve the required accuracy.*
ACCURACY:	The accuracy of the signal as supplied by the subsystem.*
MSB:	The value of the most significant bit of the word and/or field.*
LSB:	The value of the least significant bit of the word and/or field; its value should be expressed to the number of places necessary to achieve the required accuracy.*
FULLSCALE:	The maximum value the data field can attain (two times MSB minus LSB).*
FIELD NAME:	The formal name selected for a signal describing a bit, field, or single or double precision word.
BIT NO:	BIT No. is as defined in paragraph 2.2.1.
DESCRIPTION:	A functional description of the signal.
MSW:	Most significant word of a double precision signal.
LSW:	Least significant word of a double precision signal.
REMARKS:	(Optional) Additional comments, if needed, pertaining to the word.
PAGE:	Page No. of the ICD.

* = Set to N/A when a data word is divided into discrete, coded, or ASCII fields.

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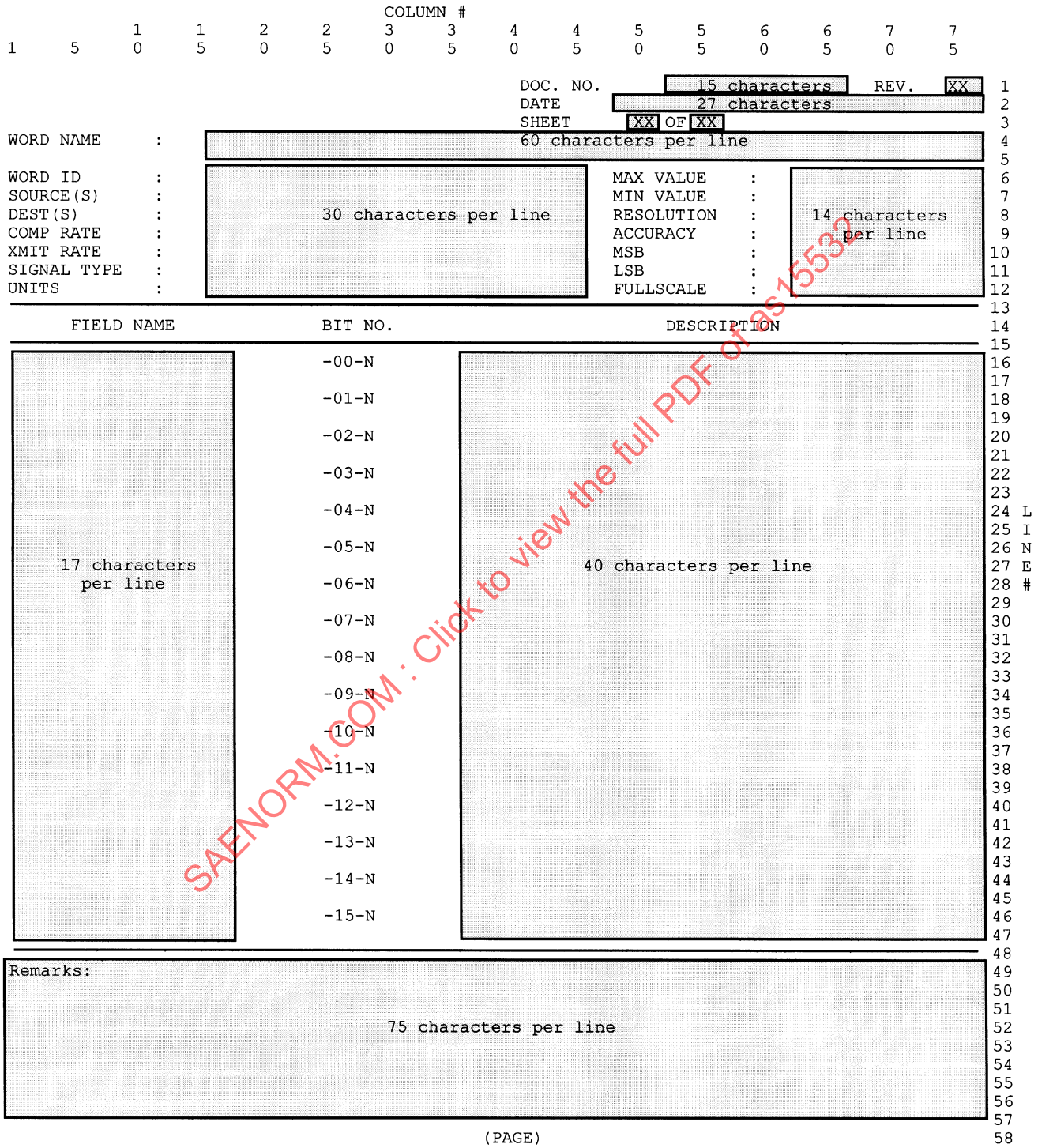

FIGURE 1 - ICD Presentation Sheet, Single Word (Sheet 1 of 4)

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SPACING - SINGLE DATA WORD ICD PRESENTATION SHEET			
FIELD NAME	ROW(S)	COLUMN(S)	NO. OF CHARS
Doc No.	1	52-66	15
Rev.	1	74-75	2
Date	2	49-75	27
Sheet #	3	49-50	2
Total Sheets	3	55-56	2
Word Name	4-5	16-75	60/line
Word ID	6	16-45	30
Max Value	6	62-75	14
Source	7	16-45	30
Min Value	7	62-75	14
Destination	8	16-45	30
Resolution	8	62-75	14
Comp Rate	9	16-45	30
Accuracy	9	62-75	14
Xmit Rate	10	16-45	30
MSB	10	62-75	14
Signal Type	11	16-45	30
LSB	11	62-75	14
Units	12	16-45	30
Fullscale	12	62-75	14
Field Name	16-17	1-17	17/line
Bit Indicator	16	28	1
Description	16-17	36-75	40/line
Field Name	18-19	1-17	17/line
Bit Indicator	18	28	1
Description	18-19	36-75	40/line
Field Name	20-21	1-17	17/line
Bit Indicator	20	28	1
Description	20-21	36-75	40/line
Field Name	22-23	1-17	17/line
Bit Indicator	22	28	1
Description	22-23	36-75	40/line
Field Name	24-25	1-17	17/line
Bit Indicator	24	28	1
Description	24-25	36-75	40/line
Field Name	26-27	1-17	17/line
Bit Indicator	26	28	1
Description	26-27	36-75	40/line
Field Name	28-29	1-17	17/line
Bit Indicator	28	28	1
Description	28-29	36-75	40/line
Field Name	30-31	1-17	17/line
Bit Indicator	30	28	1
Description	30-31	36-75	40/line
Field Name	32-33	1-17	17/line
Bit Indicator	32	28	1
Description	32-33	36-75	40/line
Field Name	34-35	1-17	17/line
Bit Indicator	34	28	1
Description	34-35	36-75	40/line
Field Name	36-37	1-17	17/line
Bit Indicator	36	28	1
Description	36-37	36-75	40/line
Field Name	38-39	1-17	17/line
Bit Indicator	38	28	1
Description	38-39	36-75	40/line
Field Name	40-41	1-17	17/line
Bit Indicator	40	28	1
Description	40-41	36-75	40/line
Field Name	42-43	1-17	17/line
Bit Indicator	42	28	1
Description	42-43	36-75	40/line
Field Name	44-45	1-17	17/line
Bit Indicator	44	28	1
Description	44-45	36-75	40/line
Field Name	46-47	1-17	17/line
Bit Indicator	46	28	1
Description	46-47	36-75	40/line
Remarks	49-56	1-75	75/line
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FIGURE 1 - ICD Presentation Sheet, Single Word (Sheet 2 of 4)

SPACING - SINGLE COMMAND/STATUS WORD ICD PRESENTATION SHHET			
FIELD NAME	ROW(S)	COLUMN(S)	NO. OF CHARS
Doc No.	1	52-66	15
Rev.	1	74-75	2
Date	2	49-75	27
Sheet #	3	49-50	2
Total Sheets	3	55-56	2
Word Name	4-5	16-75	60/line
Word ID	6	16-45	30
Xmit Rate	7	16-45	30
Field Name	12-13	1-17	17/line
Bit Indicator	12	28	1
Description	12-13	36-75	40/line
Field Name	14-15	1-17	17/line
Bit Indicator	14	28	1
Description	14-15	36-75	40/line
Field Name	16-17	1-17	17/line
Bit Indicator	16	28	1
Description	16-17	36-75	40/line
Field Name	18-19	1-17	17/line
Bit Indicator	18	28	1
Description	18-19	36-75	40/line
Field Name	20-21	1-17	17/line
Bit Indicator	20	28	1
Description	20-21	36-75	40/line
Field Name	22-23	1-17	17/line
Bit Indicator	22	28	1
Description	22-23	36-75	40/line
Field Name	24-25	1-17	17/line
Bit Indicator	24	28	1
Description	24-25	36-75	40/line
Field Name	26-27	1-17	17/line
Bit Indicator	26	28	1
Description	26-27	36-75	40/line
Field Name	28-29	1-17	17/line
Bit Indicator	28	28	1
Description	28-29	36-75	40/line
Field Name	30-31	1-17	17/line
Bit Indicator	30	28	1
Description	30-31	36-75	40/line
Field Name	32-33	1-17	17/line
Bit Indicator	32	28	1
Description	32-33	36-75	40/line
Field Name	34-35	1-17	17/line
Bit Indicator	34	28	1
Description	34-35	36-75	40/line
Field Name	36-37	1-17	17/line
Bit Indicator	36	28	1
Description	36-37	36-75	40/line
Field Name	38-39	1-17	17/line
Bit Indicator	38	28	1
Description	38-39	36-75	40/line
Field Name	40-41	1-17	17/line
Bit Indicator	40	28	1
Description	40-41	36-75	40/line
Field Name	42-43	1-17	17/line
Bit Indicator	42	28	1
Description	42-43	36-75	40/line
Remarks	44-56	1-75	75/line
Page	58		

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FIGURE 1 - ICD Presentation Sheet, Single Word (Sheet 3 of 4)

SPACING - WORD CONTINUATION ICD PRESENTATION SHEET			
FIELD NAME	ROW(S)	COLUMN(S)	NO. OF CHARS
Doc No.	1	52-66	15
Rev.	1	74-75	2
Date	2	49-75	27
Sheet #	3	49-50	2
Total Sheets	3	55-56	2
Word Name	4-5	16-75	60/line
Remarks	7-56	1-75	75/line
Page	58		

FIGURE 1 - ICD Presentation Sheet, Single Word (Sheet 4 of 4)

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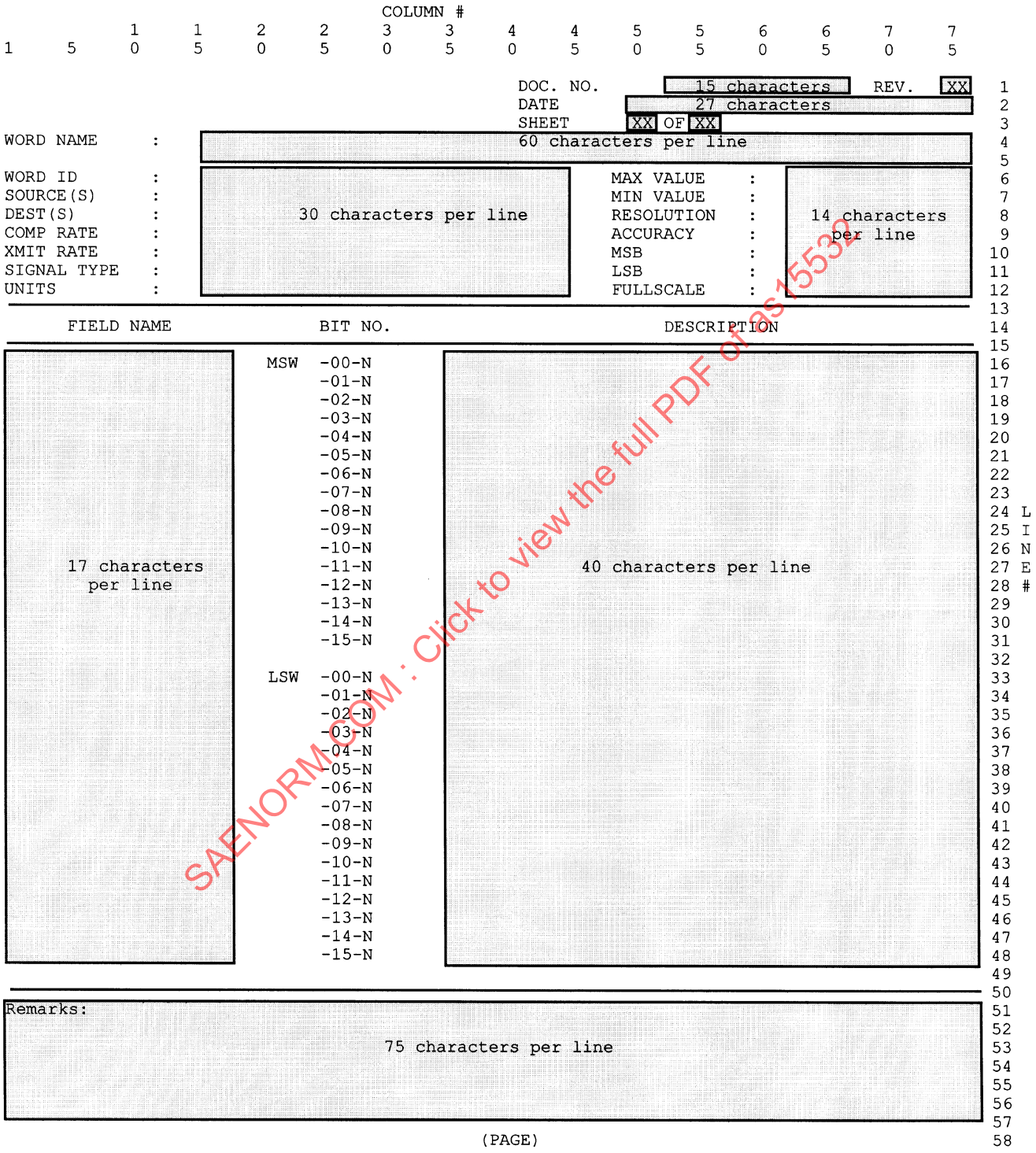

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FIGURE 2 - ICD Presentation Sheet, Double Precision (Sheet 1 of 6)

SPACING - DOUBLE DATA WORD ICD PRESENTATION SHEET			
FIELD NAME	ROW(S)	COLUMN(S)	NO. OF CHARS
Doc No.	1	52-66	15
Rev.	1	74-75	2
Date	2	49-75	27
Sheet #	3	49-50	2
Total Sheets	3	55-56	2
Word Name	4-5	16-75	60/line
Word ID	6	16-45	30
Max Value	6	62-75	14
Source	7	16-45	30
Min Value	7	62-75	14
Destination	8	16-45	30
Resolution	8	62-75	14
Comp Rate	9	16-45	30
Accuracy	9	62-75	14
Xmit Rate	10	16-45	30
MSB	10	62-75	14
Signal Type	11	16-45	30
LSB	11	62-75	14
Units	12	16-45	30
Fullscale	12	62-75	14
Field Name	16	1-17	17/line
Bit Indicator	16	28	1
Description	16	36-75	40/line
Field Name	17	1-17	17/line
Bit Indicator	17	28	1
Description	17	36-75	40/line
Field Name	18	1-17	17/line
Bit Indicator	18	28	1
Description	18	36-75	40/line
Field Name	19	1-17	17/line
Bit Indicator	19	28	1
Description	19	36-75	40/line
Field Name	20	1-17	17/line
Bit Indicator	20	28	1
Description	20	36-75	40/line
Field Name	21	1-17	17/line
Bit Indicator	21	28	1
Description	21	36-75	40/line
Field Name	22	1-17	17/line
Bit Indicator	22	28	1
Description	22	36-75	40/line
Field Name	23	1-17	17/line
Bit Indicator	23	28	1
Description	23	36-75	40/line
Field Name	24	1-17	17/line
Bit Indicator	24	28	1
Description	24	36-75	40/line
Field Name	25	1-17	17/line
Bit Indicator	25	28	1
Description	25	36-75	40/line
Field Name	26	1-17	17/line
Bit Indicator	26	28	1
Description	26	36-75	40/line
Field Name	27	1-17	17/line
Bit Indicator	27	28	1
Description	27	36-75	40/line
Field Name	28	1-17	17/line
Bit Indicator	28	28	1
Description	28	36-75	40/line
Field Name	29	1-17	17/line
Bit Indicator	29	28	1
Description	29	36-75	40/line
Field Name	30	1-17	17/line
Bit Indicator	30	28	1
Description	30	36-75	40/line
Field Name	31	1-17	17/line
Bit Indicator	31	28	1
Description	31	36-75	40/line

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FIGURE 2 - ICD Presentation Sheet, Double Precision (Sheet 2 of 6)

SPACING - DOUBLE DATA WORD ICD PRESENTATION SHEET (cont)			
FIELD NAME	ROW(S)	COLUMN(S)	NO. OF CHARS
Field Name	32	1-17	17/line
Bit Indicator	32	28	1
Description	32	36-75	40/line
Field Name	33	1-17	17/line
Bit Indicator	33	28	1
Description	33	36-75	40/line
Field Name	34	1-17	17/line
Bit Indicator	34	28	1
Description	34	36-75	40/line
Field Name	35	1-17	17/line
Bit Indicator	35	28	1
Description	35	36-75	40/line
Field Name	36	1-17	17/line
Bit Indicator	36	28	1
Description	36	36-75	40/line
Field Name	37	1-17	17/line
Bit Indicator	37	28	1
Description	37	36-75	40/line
Field Name	38	1-17	17/line
Bit Indicator	38	28	1
Description	38	36-75	40/line
Field Name	39	1-17	17/line
Bit Indicator	39	28	1
Description	39	36-75	40/line
Field Name	40	1-17	17/line
Bit Indicator	40	28	1
Description	40	36-75	40/line
Field Name	41	1-17	17/line
Bit Indicator	41	28	1
Description	41	36-75	40/line
Field Name	42	1-17	17/line
Bit Indicator	42	28	1
Description	42	36-75	40/line
Field Name	43	1-17	17/line
Bit Indicator	43	28	1
Description	43	36-75	40/line
Field Name	44	1-17	17/line
Bit Indicator	44	28	1
Description	44	36-75	40/line
Field Name	45	1-17	17/line
Bit Indicator	45	28	1
Description	45	36-75	40/line
Field Name	46	1-17	17/line
Bit Indicator	46	28	1
Description	46	36-75	40/line
Field Name	47	1-17	17/line
Bit Indicator	47	28	1
Description	47	36-75	40/line
Field Name	48	1-17	17/line
Bit Indicator	48	28	1
Description	48	36-75	40/line
Remarks	50-56	1-75	75/line
Page	58		

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FIGURE 2 - ICD Presentation Sheet, Double Precision (Sheet 3 of 6)

SPACING - DOUBLE COMMAND WORD ICD PRESENTATION SHEET			
FIELD NAME	ROW(S)	COLUMN(S)	NO. OF CHARS
Doc No.	1	52-66	15
Rev.	1	74-75	2
Date	2	49-75	27
Sheet #	3	49-50	2
Total Sheets	3	55-56	2
Word Name	4-5	16-75	60/line
Word ID	6	16-45	30
Xmit Rate	7	16-45	30
Signal Type	8	16-45	30
Field Name	12	16-45	17
Bit Indicator	12	28	1
Description	12	36-75	40
Field Name	13	1-17	17
Bit Indicator	13	28	1
Description	13	36-75	40
Field Name	14	1-17	17
Bit Indicator	14	28	1
Description	14	36-75	40
Field Name	15	1-17	17
Bit Indicator	15	28	1
Description	15	36-75	40
Field Name	16	1-17	17
Bit Indicator	16	28	1
Description	16	36-75	40
Field Name	17	1-17	17
Bit Indicator	17	28	1
Description	17	36-75	40
Field Name	18	1-17	17
Bit Indicator	18	28	1
Description	18	36-75	40
Field Name	19	1-17	17
Bit Indicator	19	28	1
Description	19	36-75	40
Field Name	20	1-17	17
Bit Indicator	20	28	1
Description	20	36-75	40
Field Name	21	1-17	17
Bit Indicator	21	28	1
Description	21	36-75	40
Field Name	22	1-17	17
Bit Indicator	22	28	1
Description	22	36-75	40
Field Name	23	1-17	17
Bit Indicator	23	28	1
Description	23	36-75	40
Field Name	24	1-17	17
Bit Indicator	24	28	1
Description	24	36-75	40
Field Name	25	1-17	17
Bit Indicator	25	28	1
Description	25	36-75	40
Field Name	26	1-17	17
Bit Indicator	26	28	1
Description	26	36-75	40
Field Name	27	1-17	17
Bit Indicator	27	28	1
Description	27	36-75	40
Field Name	28	1-17	17
Bit Indicator	28	28	1
Description	28	36-75	40
Field Name	29	1-17	17
Bit Indicator	29	28	1
Description	29	36-75	40

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FIGURE 2 - ICD Presentation Sheet, Double Precision (Sheet 4 of 6)

SPACING - DOUBLE COMMAND WORD ICD PRESENTATION SHEET (cont)			
FIELD NAME	ROW(S)	COLUMN(S)	NO. OF CHARS
Field Name	30	1-17	17
Bit Indicator	30	28	1
Description	30	36-75	40
Field Name	31	1-17	17
Bit Indicator	31	28	1
Description	31	36-75	40
Field Name	32	1-17	17
Bit Indicator	32	28	1
Description	32	36-75	40
Field Name	33	1-17	17
Bit Indicator	33	28	1
Description	33	36-75	40
Field Name	34	1-17	17
Bit Indicator	34	28	1
Description	34	36-75	40
Field Name	35	1-17	17
Bit Indicator	35	28	1
Description	35	36-75	40
Field Name	36	1-17	17
Bit Indicator	36	28	1
Description	36	36-75	40
Field Name	37	1-17	17
Bit Indicator	37	28	1
Description	37	36-75	40
Field Name	38	1-17	17
Bit Indicator	38	28	1
Description	38	36-75	40
Field Name	39	1-17	17
Bit Indicator	39	28	1
Description	39	36-75	40
Field Name	40	1-17	17
Bit Indicator	40	28	1
Description	40	36-75	40
Field Name	41	1-17	17
Bit Indicator	41	28	1
Description	41	36-75	40
Field Name	42	1-17	17
Bit Indicator	42	28	1
Description	42	36-75	40
Field Name	43	1-17	17
Bit Indicator	43	28	1
Description	43	36-75	40
Field Name	44	1-17	17
Bit Indicator	44	28	1
Description	44	36-75	40
Remarks	46-56	1-75	75/line
Page	58		

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FIGURE 2 - ICD Presentation Sheet, Double Precision (Sheet 5 of 6)

SPACING - WORK CONTINUEATION ICD PRESENTATION SHEET			
FIELD NAME	ROW(S)	COLUMN(S)	NO. OF CHARS
Doc No.	1	52-66	15
Rev.	1	74-75	2
Date	2	49-75	27
Sheet #	3	49-50	2
Total Sheets	3	55-56	2
Word Name	4-5	16-75	60/line
Remarks	7-56	1-75	75/line
Page	58		

FIGURE 2 - ICD Presentation Sheet, Double Precision (Sheet 6 of 6)

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TABLE III - Standard Terminal Acronyms for Use in Word ID's

ACRONYM	
ADC	Air Data Computer
ADF	Automatic Direction Finder
ADI	Attitude Direction Indicator
AHRS	Attitude Heading Reference System
AIU	Avionics Interface Unit
ALS	Automatic Landing System
ASI	Airspeed Indicator
ATHS	Airborne Target Handoff System
AUXS	Auxiliary Sensor
BBC	Backup Bus Controller
BC	Bus Controller
BIU	Bus Interface Unit
CAS	Control Actuation System
CDU	Control Display Unit
CNI	Communication, Navigation, Identification
CPU	Central Processing Unit
DL	Data Link
DP	Display Processor
DME	Distance Measuring Equipment
DNC	Doppler Navigation Computer
DNS	Doppler Navigation System
DTU	Data Transfer Unit
DVS	Doppler Velocity Sensor
ECM	Electronic Countermeasures
EHF	Extra High Frequency Radio
FCC	Fire Control Computer
FCS	Fire Control System
FIR	Flight Incident Recorder
FLC	Flight Control
FLIR	Forward Looking Infrared
GPS	Global Positioning System
GS	Glideslope
HAS	Hover Augmentation System
HF	High Frequency Radio
HMD	Helmet Mounted Display
HSI	Horizontal Situation Indicator
HUD	Head-Up Display
HV	Host Vehicle
ICP	Integrated Control Panel
ICS	Intercommunication System
ICU	Ignition Control Unit
IFF	Identification, Friend or Foe
ILS	Instrument Landing System
IMU	Inertial Measurement Unit
INS	Inertial Navigation System
INU	Inertial Navigation Unit
JCU	JTIDS Control Unit

ACRONYM	
KY	Crypto Unit
LOC	Localizer
MB	Marker Beacon
MC	Mission Computer
MFD	Multi-Function Display
MIU	Missile Interface Unit
MMR	Multi-Mode Receiver
MMS	Mast Mounted Sight
MPD	Multi-Purpose Display
NPU	Navigation Processing Unit
OM	Omega
PCU	Power Control Unit
PIU	PLRS Interface Unit
PNVS	Pilot Night Vision System
RAD	Radar Altimeter
RDR	Radar
RIU	Radar Interface Unit
RT	Remote Terminal
RTU	Remote Terminal Unit
RWR	Radar Warning Receiver
SAS	Stability Augmentation System
SCU	Signal Converter Unit
SG	Symbol Generator
SHVI	Standard HV Interface
SIU	Stores Interface Unit
SL	Stores Logic
SMS	Stores Management System
SS	Stores Station
SSHV	Slave SHVI
TADS	Target Acquisition Designation System
TCM	TERCOM
TCN	TACAN
TCS	Tactical Camera System
TM	Telemetry
TSC	Time Sync Controller
UHF	Ultra High Frequency Radio
VDI	Vertical Direction Indicator
VHF	Very High Frequency Radio
VOR	VHF Omni-Directional Range Radio
VSI	Vertical Situation Indicator
WCS	Weapon Control System
WIU	Weapon Interface Unit
WXR	Weather Radar

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TABLE IV - Word ID Examples

WORD ID	TRANSFER TYPE	DESCRIPTION
INS 03-FLIR02-07	RT-to-RT	INS is transmitting word number 07 from subaddress 03 to subaddress 02 of FLIR
AHRS03-MC BC-07	RT-to-BC	AHRS is transmitting word number 07 from subaddress 03 to the MC (which is the bus controller).
BC1 BC-HUD205-07/08	BC-to-RT	BC1 (the bus controller) is transmitting word number 07 and 08 to subaddress 05 of HUD2.
NPU BC-ALL 04-15	Broadcast	NPU (the bus controller) is transmitting word number 15 to subaddress 04 in the broadcast mode of operation.

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2.2 General Rules for 15531/1553 Word Construction:

The general rules for constructing compatible word formats apply to the standard words listed in paragraph 2.5 and to those words that do not meet the requirements for the standardized format. The following paragraphs provide generalized rules for establishing the basic word structure.

2.2.1 Data Word/Bit Designation: Figure 3 shows the horizontal presentation of the 16-bit data field of the data word defined in 15531/1553. The data field bits are numbered 00 through 15, left to right, with bit 00 designated as the most significant bit (MSB) and bit 15 designated as the least significant bit (LSB). In conformance to the requirements of 15531/1553, the most significant bit (bit 00) is transmitted first on the data bus.

The MSB and LSB designations indicated here refer to the relative weighting of the entire 16 bits in a 2's complement representation of signal value. The MSB and LSB designations will also be employed to define the most significant and least significant bits of parameters requiring less than or more than 16 bits. There can also be more than one signal value in a data word, thus requiring multiple MSB's and LSB's within the data field. Discrete bits and binary codes are also used to represent characters or modes. Throughout this document the term "data word" will be used in reference to this 16-bit data field.

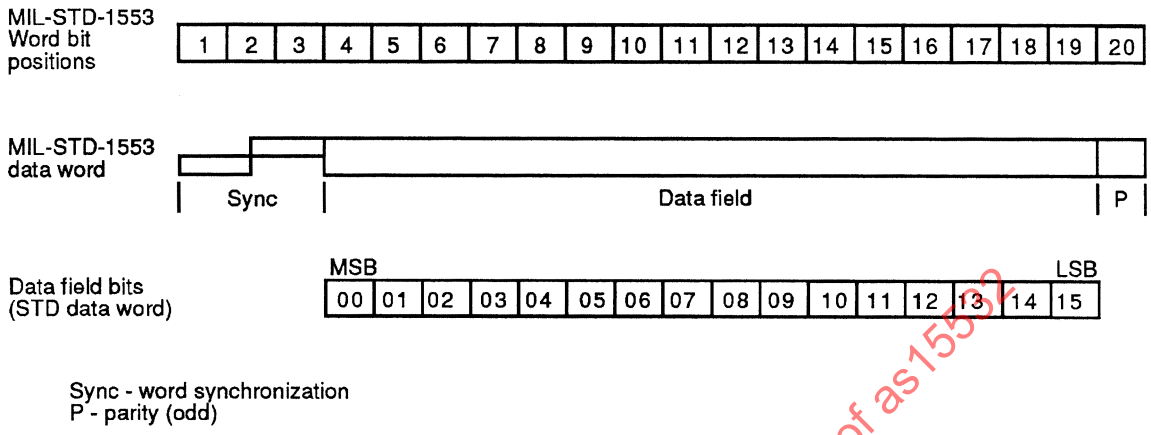

FIGURE 3 - Standard Data Word Bit Designation Related to Word Definition

2.2.2 Signal Coding and Placement: Several coding techniques are provided because of the variety of signal types that must be accommodated in a data word format. The following are the typical coding conventions and the presentation notations:

	Data Type	Presentation Notation
a.	2's complement	Sign, MSB, LSB, and N (data bits)
b.	Unsigned numeric	MSB, LSB, and N (data bits)
c.	Discrete bit	D
d.	Coded bits	MSB, LSB, and C (data bits)
e.	Binary coded decimal (NBCD, 8421)	MSB, LSB, and B (data bits)
f.	ASCII alphanumeric codes	MSB, LSB, and A (data bits)
g.	Validity bit	V
h.	Unused or reserved bits, logic 0	0
i.	Logic 1	1
j.	Floating point	MSB, LSB, Sign, & M (Mantissa) (data bits) MSB, LSB, Sign, & E (Exponent) (data bits)

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2.2.2 (Continued):

Figure 4 shows some examples of typical word formats employing the above digital representations. The following general rules apply to all word structures:

a. The MSB shall always be transmitted first, in accordance with 15531/1553.

b. All spare or unused bits shall be transmitted as logic 0's, in accordance with 15531/1553.

c. In the event that multiple precision quantities (information accuracy or resolution requiring more than 16 bits) are transmitted, the most significant bits shall be transmitted first, followed by the word(s) containing the less significant bits.

d. The numerical value of the data should be represented using 2's complement notation. The value of the MSB should be an integer power of 2.

e. Left justify; the sign, MSB, or first discrete (in that order of precedence) should appear in the left most (bit 00) position.

f. No unused zero (0) bits should be placed in more significant bit positions than data. The exception to this rule is ASCII-7. In standard 7-bit ASCII, the first bit of each character field (MSB) is set to logic zero(0), and the 7-bit ASCII code occupies the remaining seven bits of the field.

g. Combining numeric data with discrete or coded data in the same word should be avoided.

h. Packing of discretes with coded data of similar functions within the receiving subsystem should be limited.

2.2.2.1 2's Complement: Several potential implementations for the positioning of 2's complement data were compared with each other and evaluated for consideration as a recommended standard. These implementations are:

a. Left justification of data and sign bit
b. Right justification of data and sign bit
c. Sign left-justified and value right-justified

The format for 2’s complement data (see Figure 4) should be one data item per word, left—justified with sign bit in bit position 00.

The sign bit is designated as the leftmost bit of the data word to facilitate use of the arithmetic shift instructions available with many processors. The arithmetic shift instructions will left-justify the data (preparing for transmission) or shift the data to the right (moving received data from input buffer) while maintaining the integrity of the sign bit. This is not possible with right-justified data and sign bit because arithmetic shift instructions assume the sign bit to be bit 00.

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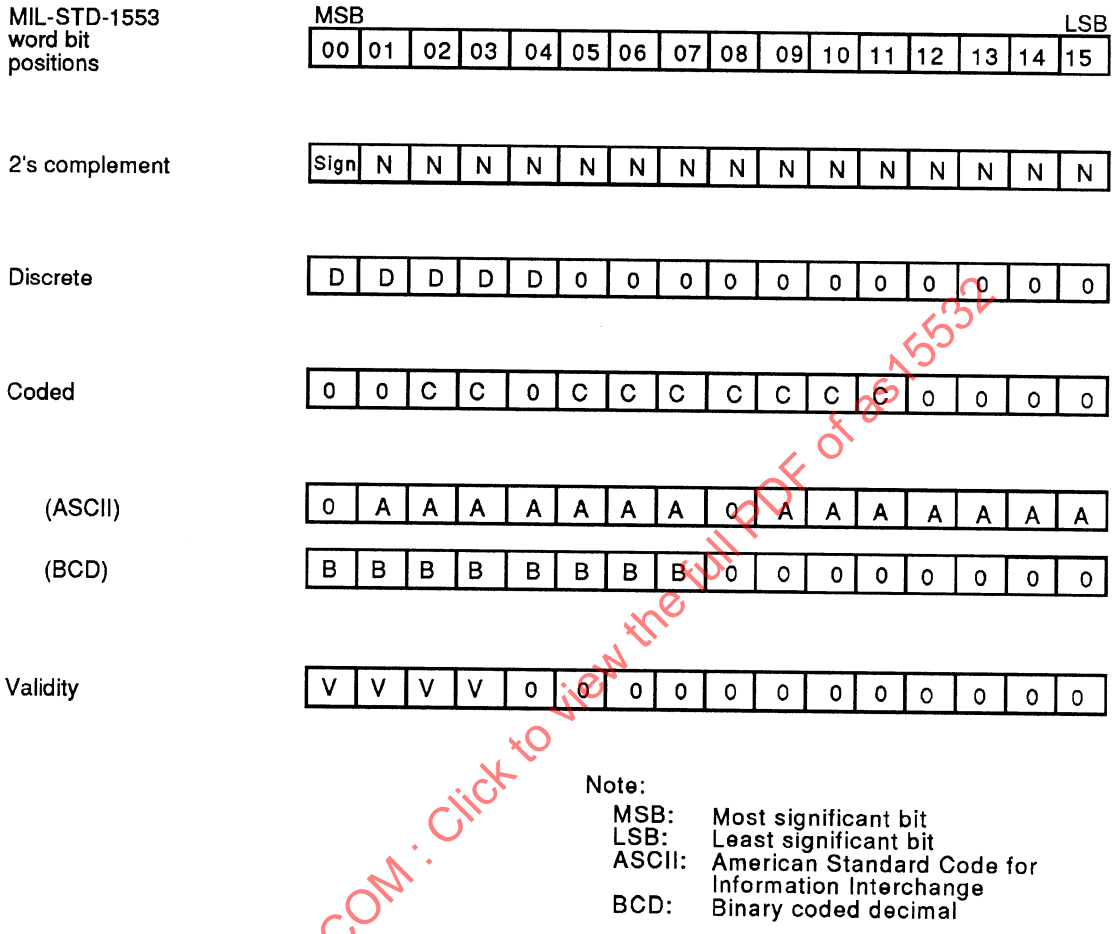

FIGURE 4 - Word Format Example

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2.2.2.1 (Continued):

If the data and sign bit were right-justified, special routines would have to be written to move the information to the left since most processors look for the sign bit in the leftmost bit position.

The implementation in which the sign bit is left-justified and the value right-justified provides for range increase with no change to the data word required. However, there are also some problems with this method: (1) extra processing time and memory would be required to put the two pieces of information together for storing and (2) it could require storage of all 16 bits of information regardless of how many bits are actually needed to transfer the data. All but a few of the fixed-point data words examined in the source documents were in the recommended format.

2.2.2.2 Unsigned Numeric: Unsigned numeric data is any parameter, whether integer or fractional, that is transmitted only as a positive value. Unsigned numeric data should only be used when 16-bit range or resolution is required. The use of 2's complement representation is highly preferred.

The format for unsigned numeric data should be one data item per word, occupying all 16 bits. The value of the MSB should be an integer power of 2.

2.2.2.3 Discrete Bit: Several potential implementations for packing discrete data were compared with each other and evaluated for consideration as a recommended standard. These implementations are:

a. Group all data bits in leftmost positions
b. Group all data bits in rightmost positions
c. Intersperse data bits with spares

The format of packing discrete data should be to group only functionally related data bits and pack them on the left side of the word with no spares interspersed (see Figure 4). Discretes should be named so that the name indicates a true (1) condition (e.g., RANGE INVALID = 1).

If all data bits are grouped in the leftmost positions, the leftmost bit can be tested for positive indication, then shifted to the left, the following bit tested and shifted, etc. This software method is an efficient way of processing discrete bits. One reason for this is that it requires less coding because the test-shift routine can be used repeatedly by looping. A single, simple subroutine is therefore capable of handling any grouping of single-bit discrete data fields. Another advantage to putting the data on the left and the spares on the right is that is allows for future expansion with minimal change to existing code.

If the data bits are grouped in the rightmost positions, the entire group of data bits can be read as an integer (without shifting) and this integer value used as an index. Although this is a valid software technique, its application is limited.

By interspersing spares throughout the data, functionally unrelated data can be separated. The disadvantage of this practice is that it can make the system difficult to understand and thus difficult to maintain. In addition, the interspersed spare bits will cause problems if the test-shift method of reading data is used. Rather than use spares as separators, it is recommended that unrelated data be put in different words.

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2.2.2.4 Coded Bits: Several potential implementations for packing coded data were compared with each other and evaluated for consideration as a recommended standard. These implementations are:

a. LSB of each field positioned on a full-, half-, or quarter- word boundary, filling in leftover bits with spares.

b. All data grouped together in the leftmost bits.

c. MSB of each field positioned on a full-, half-, or quarter- word boundary.

The format for packing a coded data type should be to position the LSB of each field on a full—, half—, or quarter—word boundary (see Figure 4).

A coded data type is a parameter set containing uniquely coded values (composed of two or more bits within the set rather than a continuous range of values). Examples of coded data are alphanumerics (ASCII), switch setting codes, and weapon type codes.

It is recommended that the LSB of all fields be placed on full-, half-, or quarter-word boundaries because many processors have instructions to read full-, quarter-, or half-words. If the fields are not on a boundary, the number of instructions is increased, processing time is increased, and the coding becomes more complex.

There are drawbacks to this method. It does not permit easy future expansion within a word. In addition, bus loading may be increased since this method uses more words than would be used if the data were packed in the leftmost bits.

2.2.2.5 Validity Bit: Several potential implementations for positioning of validity bits were compared with each other and evaluated for consideration as a recommended standard. These implementations are:

a. Positioning the validity bit in the same word as the data item to which it applies.
b. Placing all validity bits in a validity word.

The format should be to place all validity bits in a validity word and to left—justify the validity bits (see Figure 4).

Keeping the validity bit in the same word as the data to which it applies rather than in a separate validity word decreases the bus loading. It also allows only one word at a time to be operated on, thus decreasing processing time.

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2.2.2.6 Floating Point: The representation of floating point data has been left to the discretion of the system designer. All of the floating point representations examined were based on servicing specific system processors. It is anticipated that this will be true in future systems and, therefore, the floating point representation used should reflect the representation in the target processor. The Army, Navy, and Air Force all have standard floating point representations, described in MIL-STD-1862, AN/AYK-14 Programmer Reference Manual (14122000), and MIL-STD-1750, respectively.

MIL-STD-1862 provides single length (32-bit) and double length (64-bit) floating point representations. The 32-bit representation has a sign bit as the MSB, followed by an 8-bit exponent and a 23-bit fraction. The 64-bit representation has a sign bit as the MSB, followed by an 8-bit exponent and a 52-bit fraction.

MIL-STD-1750 provides 32-bit and 48-bit floating point representations. The 32-bit representation has a sign bit as the MSB, followed by a 23-bit mantissa (fraction) and an 8-bit exponent. The 48-bit representation has a sign bit as the MSB, followed by a 23-bit mantissa, an 8-bit exponent, and 16 bits representing the least significant portion of the mantissa.

The AN/AYK-14 provides a 32-bit floating point representation with the exponent sign bit as the MSB, followed by a 7-bit exponent, a mantissa sign bit, and a 23-bit mantissa.

2.3 How to Construct a Data Word Format:

The purpose of this paragraph is to guide the user through the task of establishing the specific data word formats needed for system integration. The information required to start this process is, as a minimum, a signal list. The task will be easier if more information about each signal is known, such as engineering units (if any), maximum and minimum values, resolution, accuracy, and computation rate. This signal information will be required for each signal of the signal list before the word and message format definition can be completed.

The method for establishing a data word format is presented as a flowchart in Figure 5 with an explanation following:

a. Select a signal. Example: present position latitude.

b. Refer to Table V, Index of Signal Categories, and find the category that applies to the signal. In the example signal, present position latitude, the keyword is latitude. Latitude is an angular measurement; therefore, the signal falls in the "angular" category. Note that Table V is divided into categories for signals with engineering units and categories of unitless signals. It will be easier to find the appropriate category if it is known whether the signal is unitless or which units apply. The use of keywords and modifiers associated with each category may aid in identifying the correct category.

After the signal category is determined, go to Step e.

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2.3 (Continued):

If the category cannot be determined or there is uncertainty whether the signal really fits in a given category, go to Step c.

c. If there is still uncertainty about the signal category, get a better definition of the signal. Determine more descriptive or functional details about the signal, including the source, destination, name, and engineering units (if any). Then go back to Step b. Otherwise, go to Step d.

d. If the signal definitely does not fall into any of the listed categories, refer to paragraph 2.2, General Rules for 15531/1553 Word Construction, for general guidance in establishing the data word format for this signal.

e. Refer to Table VI, Standard Data Word Format Index. Using the category identified in Step b (from Table V), select the appropriate units and precision, and note the standard data word format table number. Those formats indicated as double precision may be used as either a single or double precision word, based on the requirements of the particular application.

For the example signal, present position latitude, the correct category is "Angular". In the standard data word format column of the table we find and note for later use the reference to Table IX. Find the category of your signal in Table VI and note the tables referenced in the standard data word format column.

f. Refer to paragraph 2.5, Standard Data Word Formats, and the applicable tables (noted in Step e). Construct the data word format and complete the ICD data sheet(s) for this signal.

g. A necessary part of data word format development is the selection of a formal signal name for each signal. Refer to paragraph 2.4, Naming, to select the formal signal name. Proceed to Step h.

h. Select next signal and start the process at Step b.

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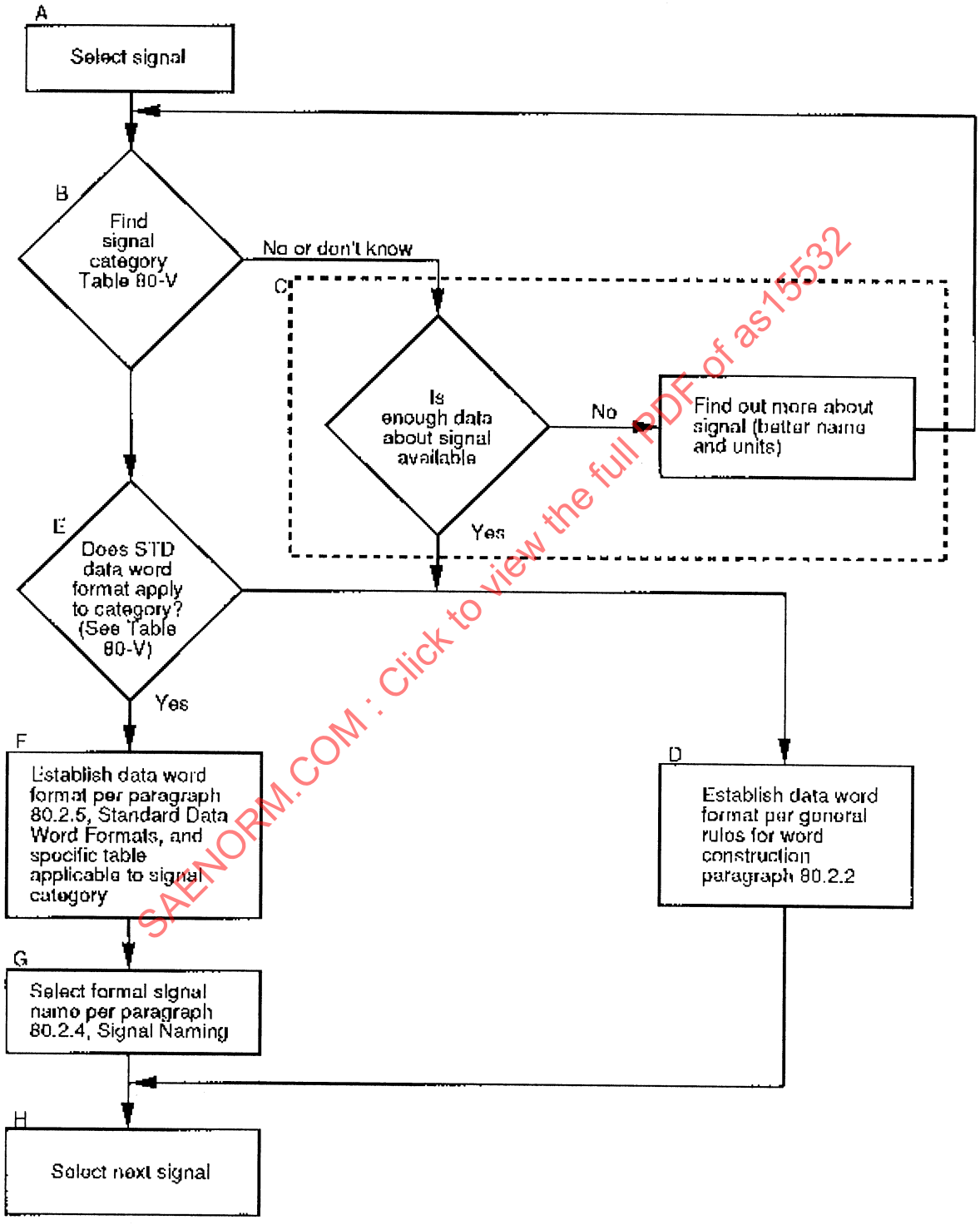

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FIGURE 5 - Establishing a Data Word Format

TABLE V - Index of Typical Signal Categories (Sheet 1 of 6)

Acceleration Tables 80-VII and 80-VIII		Angular Table 80-1X		Angular Acceleration Table 80-X		Angular Velocity Table 80-XI		ASCII Data Table 80-XII	
Keyword	Typical Modifiers	Keyword	Typical Modifiers	Keyword	Typical Modifiers	Keyword	Typical Modifiers	Keyword	Typical Modifiers
Acceleration	Down East Lateral Longitudinal Normal North Target, X Target, Y Target, Z Turret X Y Z	Angle	AOA (angle-of-attack) AOA, error AOA, true Drift Ground track Ground track, present Pitch Roll Sideslip Steering Tilt Wander	Acceleration	Down East North Pitch Roll Yaw	Gyro bias	Correction X Correction Y Correction Z	Bar	Horizontal Vertical
		Azimuth	Cross hair Error Platform Relative Rel. to steerpoint Rel. to Nth waypoint Rel. to Nth markpoint Symbol			Rate	Angular Azimuth Deflection Elevation Pitch Rotation Yaw	Character	Left Middle Right
		Bearing	(Same as azimuth)					Display	Alpha Border Branch Character Control Data Intensity Miscellaneous Numeric Position Radar Symbol Window
		Course	Desired Ground track Magnetic, computed Magnetic, inserted					Symbol	Control Identification Internal Reference
		Elevation	Bullet Circle Command angle Error LOS (loss-of-signal) Position Reference, aircraft Scale Target						
		Heading	Error Magnetic, inserted Magnetic, present True True, inserted True, present						
		Latitude	Markpoint Nth markpoint Nth waypoint Present pos., inserted Waypoint pos., inserted						
		Longitude	(Same as latitude)						
		Variation	Magnetic, computed Magnetic, inserted						

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TABLE V - Index of Typical Signal Categories (Sheet 2 of 6)

BCD Data Table 80-XIII		Convergence Factor Table 80-XIV		Cosine, Sine Table 80-XV		Counts Tables 80-XVI and 80-XVII	
Keyword	Typical Modifiers	Keyword	Typical Modifiers	Keyword	Typical Modifiers	Keyword	Typical Modifiers
Channel	Select	Convergence factor	Inserted Present, in use	Cosine	Direction a. CXX (ref. platform to earth CXY coordinate system) CXZ b. DIRXL (ref. A/C body DIRYL coordinate system) DIRZL c. DIRCOSX (same as b) DIRCOSY DIRCOSZ Heading Pitch Roll	Counts	Track control, RN Track control, n
IFF	Code Control Interrogator					Date	Julian Year
ILS	Channel Mode					Frames	Film recording data
Radio	Select Status Test					Pulses	Ripple
Receiver	Channel Command Frequency Tune					Revolutions	Revolutions per minute Rotor speed No. n
RF	Channel Disposition Level Transmit			Sine	Heading Pitch Roll	Rounds	Remaining
TACAN	Channel Mode					Words	Instrumentation port data
UHF/VHF	Channel Mode						
VOR	Channel Mode						

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TABLE V - Index of Typical Signal Categories (Sheet 3 of 6)

Data Validity Table 80-XVIII and 80-XIX		Deviation Table 80-XX		Cosine, Sine Table 80-XV		Distance Tables 80-XXI through 80-XXV	
Keyword	Typical Modifiers	Keyword	Typical Modifiers	Keyword	Typical Modifiers	Keyword	Typical Modifiers
Error protection	(None)	Deviation	Glideslope Localizer TACAN VOR XTK	Altitude	Above fixpoint Barometric Barometric reference Desired Electronic Altimeter Helo (Helicopter) Inertial Pressure Radar Sonobuoy launch Store System Target	Rate position	Acquisition cursor
Checksum	Bits Word					Separation	Impact
						Wingspan	(None)
Validity	Bit Data Discrete					X	Cursor connection Cursor total Delta Display delta Display position Display - translate Helo position Helo position at initialization Ownship position Pointer position Position Position, fly-to-point Sonobuoy position Symbol position
				Azimuth	Cursor Deviation steering Steering dot		
				Circle	Display		
				Distance	To Nth waypoint/markpoint To steerpoint	Y	(Same as X)
				Easting	Inserted position Inserted waypoint Nth waypoint/markpoint MGRS Present position MGRS	Z	Cursor total Position
				Elevation	(Same as azimuth)		
				Error	Allowable steering Crosstrack Position east Position north		
				Height	Above target (HAT)		
				Northing	(Same as easting)		
				Range	Aircraft symbol Contact Ground track, incremental Manual Maximum Minimum Pull up Radar Slant TACAN Tactical X, relative target Y, relative target Z, relative target		

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TABLE V - Index of Typical Signal Categories (Sheet 4 of 6)

Flow Tables 80-XXVI and 80-XXVII		Frequency Tables 80-XXVIII through 80-XXX		Mass Tables 80-XXXI and 80-XXXII		MGRS Table 80-XXXIII		Percent Table 80-XXXIV	
Keyword	Typical Modifiers	Keyword	Typical Modifiers	Keyword	Typical Modifiers	Keyword	Typical Modifiers	Keyword	Typical Modifiers
Fuel	(None)	Frequency	ADF-n HF-n UHF-n VHF-n VOR-n ILS-n	Mass	Aircraft Fuel Ordnance Payload	MGRS	Area Datum Grid zone Easting Northing Spheroid 100,000 meter Grid square Ellipsoid	Percent	(None)
Oil	(None)								

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TABLE V - Index of Typical Signal Categories (Sheet 5 of 6)

Pressure Tables 80-XXXV and 80-XXXVI		Ratio Table 80-XXXVII		Temperature Table 80-XXXVIII		Time Tables 80-XXXIX through 80-XLIII	
Keyword	Typical Modifiers	Keyword	Typical Modifiers	Keyword	Typical Modifiers	Keyword	Typical Modifiers
Differential	Pressure altitude	Ratio	Air density Pressure	Temperature	Celsius Engine inlet Exhaust gas Fuel inlet Outside air Total True freestream air	Calendar	(None)
Discharge	Compressor turbine					Clock	Kalman
Oil	Engine Transmission					Time	Align Almanac reference Coordinated universal Greenwich mean Of day Sonobuoy, last correct Sonobuoy launch Symbol Tag
Impact	Indicated						
Static	Indicated						
Fuel						Time to	Destination Go Nth waypoint/markpoint Steerpoint
						Pulse	Width Repetition interval

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TABLE V - Index of Typical Signal Categories (Sheet 6 of 6)

Torque Table 80-XLIV		Vector word Table 80-XLV		Velocity Tables 80-XLVI through 80-L		Voltage Table 80-LI	
Keyword	Typical Modifiers	Keyword	Typical Modifiers	Keyword	Typical Modifiers	Keyword	Typical Modifiers
Engine	(None)	Asynchon-ous	Message demand Action demand	Airspeed	Calibrated Indicated True	Voltage	Display intensity Fore/aft cursor deflection Left/right cursor deflection Stick X deflection Stick Y deflection
Shaft	(None)			Groundspeed	Predicted Present Tail warning system		
				Mach	Number		
				Range rate	None		
				Speed	Bias Desired Ground Helo Helo wind Ownship Symbol True Water		
				Velocity	Correction X Correction Y Doppler drift Doppler heading Doppler vertical Down Drift East Heading North Vertical Wind X X, relative target Y Y, relative target Z Z, relative target		

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2.4 Naming:

A necessary part of data word format development is the selection of a formal signal name for each signal. A naming convention will make signals more easily traceable within an integrated system as well as across various systems.

The basic principle for naming signals consistently is placing the most important word (keyword) first, followed by modifiers. The keyword is the word most closely related to the category or engineering units (if any) of the signal. The keyword may be the same as the signal category. Appropriate modifiers should be added as required to create a unique signal name for each data word within the system. For example, "latitude, present position, INS."

Table V presents typical signal names by category. Within each category is a list of keywords associated with that category and some typical modifiers associated with those keywords. This table should be helpful in selecting a formal signal name by using the following procedure:

a. Find the appropriate category for your signal. For our example signal, present position latitude, the category is "Angular".

b. Determine if your signal's keyword is listed. For the example signal, present position latitude, the keyword is "latitude".

c. If your signal's keyword is not listed under the appropriate category, consider using the category name as your signal's keyword. If the category name is an inappropriate keyword for your signal, choose the most meaningful word in the name as the keyword.

d. Define your signal's formal name by placing the keyword first, followed by the remaining words (modifiers). Table V also lists some typical modifiers for common keywords. The formal name for our example signal would therefore be "latitude, present position."

e. Return to paragraph 2.3 to complete data word format definition.

2.5 Standard Data Word Formats:

This paragraph presents the standard data word formats, and provides the user guidance necessary to fit real-life signals into the standard data word formats. An example signal is used to illustrate the application of the standard data word formats to real-life signals. The derivation of the example data word is presented in the following paragraphs, and the completed data word format is presented in Figure 6. Figure 7 depicts the standard vehicle fixed-axis coordinate system. Other coordinate systems referenced in the ICD should be similarly illustrated.

Table VI is an index that keys the user into the various standard data word formats. The standard data word formats are presented in Tables VII through LI. Having established the category of your signal (by following the steps outlined in paragraph 2.3), refer to the appropriate standard data word format(s), as indexed in Table VI, and to the following example for guidance.

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TABLE VI - Standard Data Word Format Index

CATEGORY	UNITS	WORD(s)/ PRECISION	TABLE No.
Acceleration	Meters/Sec/Sec	Double	VII
	Feet/Sec/Sec	Single	VIII
Angular	Semicircles	Double	IX
Angular Acceleration	Semicircles/Sec/Sec	Single	X
Angular Velocity	Semicircles/Sec	Double	XI
ASCII Data	N/A (Character)	One	XII
BCD Data	N/A (Channel Select)	One	XIII
Convergence Factor	N/A	Single	XIV
Cosine/Sine	N/A	Double	XV
Counts	N/A (Signed)	Single	XVI
	N/A (Unsigned)	Single	XVII
Data Validity	N/A (Checksum)	Single	XVIII
	N/A (Error Protection)	One	XIX
Deviation	Diff. in Depth of Modulation	Single	XX
Distance	Meters	Double	XXI
	Feet	Double	XXII
	Kilometers	Double	XXIII
	Nautical Miles (Low Range)	Single	XXIV
	Nautical Miles (High Range)	Double	XXV
Flow	Kilograms/Hour (Low Range)	Single	XXVI
	Kilograms/Minute (High Range)	Single	XXVII
Frequency	Hertz	Four	XXVIII
	Kilohertz (ADF)	One	XXIX
	Megahertz (UHF/VHF/HF)	One	XXX
Mass	Kilograms (Low Range)	Single	XXXI
	Kilograms (High Range)	Single	XXXII
MGRS	N/A	Five	XXXIII
Percent	N/A	Single	XXXIV
Pressure	Kilopascals	Double	XXXV
	Inches of Mercury	Single	XXXVI
Ratio	N/A	Single	XXXVII
Temperature	Celsius	Single	XXXVIII
Time	Month, Day, Hour, Minute, Second	Three	XXXIX
	Microseconds (Time Tag)	Double	XL
	Seconds (Time To)	Single	XLI
	Microseconds (PRI)	Single	XLII
	Nanoseconds (Pulse Width)	Single	XLIII
Torque	Newton-Meters	Double	XLIV
Vector Word	N/A	Single	XLV
Velocity	Meters/Sec	Double	XLVI
	Feet/Sec	Double	XLVII
	Kilometers/Hour	Single	XLVIII
	Knots	Single	XLIX
	Mach Number	Single	L
Voltage	Volts	Double	LI

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2.5 (Continued):

An effective means of guiding the user in establishing data word formats for his signals is by example. We have been using a typical signal, "latitude, present position," as our example. The data word format for this signal is derived as follows. It is necessary to have certain information about the signal before the data word format can be defined. For signals that have engineering units, the minimum necessary information is as follows:

a. The formal word name (established in paragraph 2.4)
b. The engineering units
c. The range (maximum and minimum) of signal value
d. The accuracy required

The following information is used in our example:

WORD NAME	:	LATITUDE
UNITS	:	DEGREES
RANGE	:	±90 DEGREES (POSITIVE IS NORTH)
ACCURACY	:	0.00000273 DEGREES

Refer to the index in Table VI. We established that the category of our example signal is "angular." The index refers us to Table IX for angular category, double precision. Proceed as follows to decide whether data word will be single or double precision:

a. Is RANGE of signal covered by MAX VALUE and MIN VALUE of standard data word format? If not, define data word format for the signal by using the General Rules for Word Construction, paragraph 2.2, and the standard data word formats as examples.

   The RANGE of our signal is ±90 DEGREES. We see that the UNITS of the standard data word format are SEMICIRCLES (1 semicircle = 1 pi radian), so we must convert all signal parameters from DEGREES to SEMICIRCLES. To convert, divide DEGREES by 180. The signal RANGE (±90 DEGREES) becomes ±0.5 SEMICIRCLES, and is within the MAX VALUE (+1) and MIN VALUE (-1) of the standard format.

b. Can the required signal ACCURACY be transmitted using the single precision standard format? If yes, proceed; if no, can double precision standard format accommodate ACCURACY? If yes, proceed; if no, refer to paragraph 2.2, General Rules for 15531/1553 Word Construction, and define data word format for the signal using the standard data word formats as examples.

   The example signal's required ACCURACY is 0.00000273 DEGREES, or, after conversion, 0.0000000152 SEMICIRCLES. The LSB value of the first word of the standard format is 2^{-15} (i.e., 0.0000305176) SEMICIRCLES. The format with accuracy of 0.0000305176 cannot accommodate the 0.0000000152 accuracy required. The LSB value of the double precision standard format is 2^{-31} (i.e., 0.000000000466) SEMICIRCLES, which is sufficient to accommodate the 0.0000000152 signal accuracy.

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DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Latitude, Present Position, INS

WORD ID	:	INS 03-FCC 12-04/05	MAX VALUE	:	0.5
SOURCE(S)	:	INS	MIN VALUE	:	-0.5
DEST(S)	:	FCC	RESOLUTION	:	3.7252E-9
COMP RATE	:	8	ACCURACY	:	0.0000000152
XMIT RATE	:	8	MSB	:	0.5
SIGNAL TYPE	:	2's complement	LSB	:	1.6566E-9
UNITS	:	Semicircles	FULLSCALE	:	0.9995343387

FIELD NAME	BIT NO.	DESCRIPTION
Latitude	MSW -00-N	Sign
	-01-N	MSB
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	
	LSW -00-N	
	-01-N	
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	RESOLUTION: 3.7252 E-9
	-13-0	
	-14-0	
	-15-0	LSB

REMARKS: Positive Sense: Plus is North
* - Application Dependent

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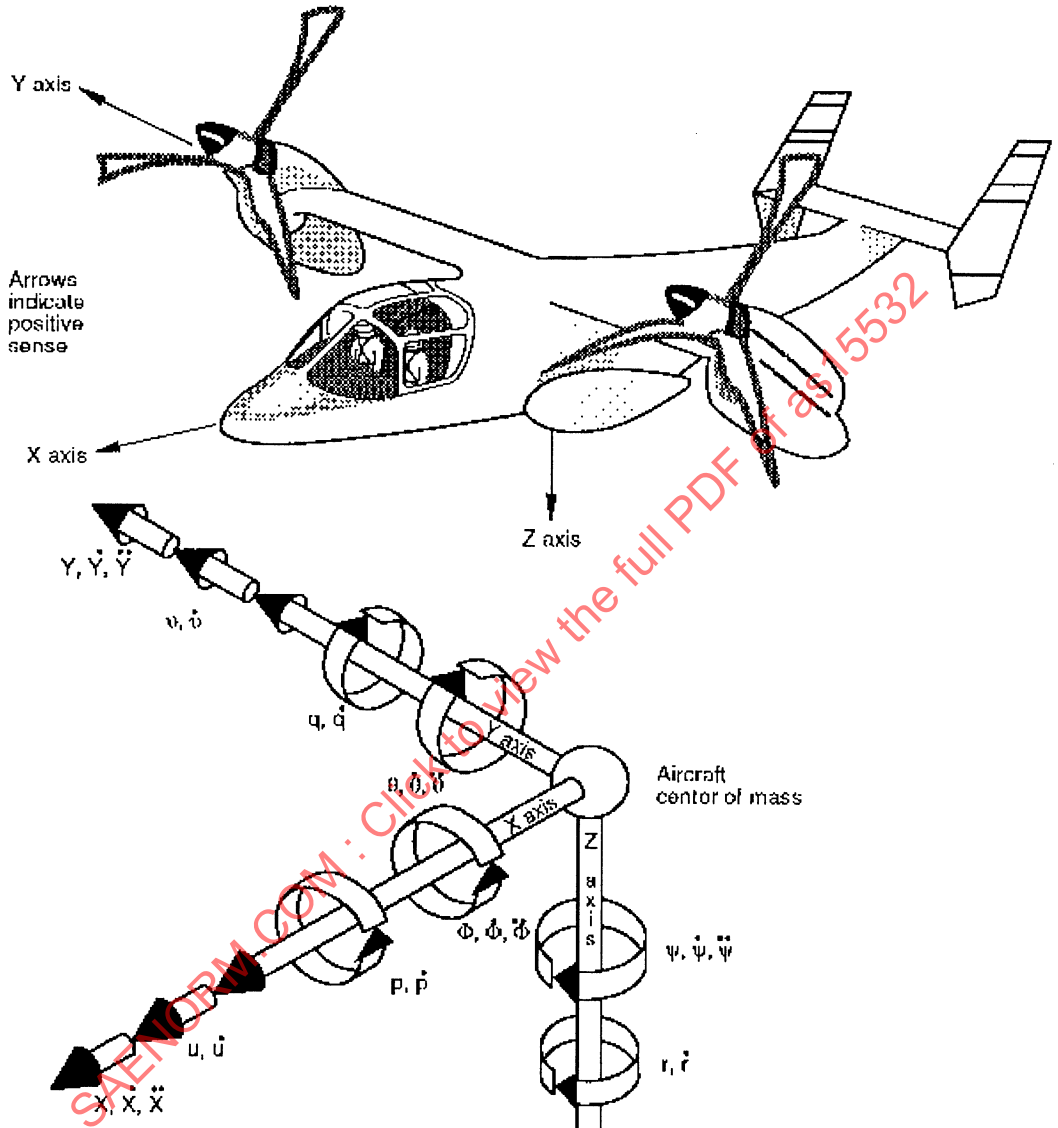
FIGURE 6 - Data Word Format for Example Signal



	Velocities	Position/ angle	Acceleration
Forward	$\dot{X}$, u	X	$\ddot{X}$, $\dot{u}$
Side	$\dot{Y}$, v	Y	$\ddot{Y}$, $\dot{v}$
Vertical	$\dot{Z}$, w	Z	$\ddot{Z}$, $\dot{w}$
Roll	p, $\dot{\Phi}$	Φ	$\dot{p}$, $\ddot{\Phi}$
Pitch	q, $\dot{\theta}$	θ	$\dot{q}$, $\ddot{\theta}$
Yaw	r, $\dot{\psi}$	ψ	$\dot{r}$, $\ddot{\psi}$

FIGURE 7 - Vehicle Fixed-Axis Coordinate System

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2.5 (Continued):

By the preceding steps it was determined that the appropriate standard data word format for the example signal is Table IX, for angular category, double precision.

Now use a blank ICD presentation format sheet (see Tables I and II for single and double precision formats, respectively) as a worksheet and to document the data word format that will be derived. We need to use the ICD format of Table II because our example data word will be double precision. The completed ICD presentation for our example signal's data word format is shown in Figure 6. The derivation of each entry which is not application dependent is as follows:

a. DOC. NO.: Application dependent.

b. REV.: Application dependent.

c. DATE: Application dependent.

d. SHEET 1 OF #: 1.

e. WORD NAME: LATITUDE, PRESENT POSITION, INS (formal signal name, selected in paragraph 2.4).

f. WORD ID: INS 03-FCC 12-04/05

g. SOURCE(S): INS (source of example signal).

h. DEST(S): FCC (destination of example signal).

i. COMP RATE: 8 Hertz.

j. XMIT RATE: 8 Hertz.

k. SIGNAL TYPE: The encoding format of the digital data is 2's complement notation, as specified in the standard format.

l. UNITS: Semicircles (as specified in standard data word format).

m. MAX VALUE: The maximum value of our signal is +0.5 semicircles (converted from +90 degrees). *

n. MIN VALUE: The minimum value of our signal is -0.5 semicircles (converted from -90 degrees). *

o. RESOLUTION: 0.0000000038 semicircles (determination of RESOLUTION is application dependent). *

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2.5 (Continued):

p. ACCURACY: 0.0000000152 semicircles (the signal accuracy). *

q. MSB: 0.5 semicircles (MSB value as specified in standard data word format). *

Note: The MSB value is fixed for each standard data word format; therefore, the maximum transmittable range (MAX VALUE and MIN VALUE) of each data word format is fixed.

r. LSB: 0.0000000005 semicircles (LSB value as specified in standard data word format). *

s. FULLSCALE: 0.995343387 semicircle (2 times the MSB minus the LSB).*

t. FIELD NAME: Latitude (application dependent).

u. DESCRIPTION: Application dependent.

v. MSW: This defines the bit assignments for the first data word. This is a signed quantity; therefore, BIT-00 is the Sign. BIT-01 is the MSB (MSB of data is transmitted first per AS15531/1553B). BIT-02 through BIT-15 are data bits.

w. LSW: This defines the bit assignments for the second data word. BIT-00 through BIT-12 are data bits. BIT-15 is the LSB. BIT-13 through BIT-15 are not used (set to zero).

x. REMARKS: POSITIVE SENSE: PLUS IS NORTH (statement that data is transmitted as plus equals north latitude).

y. PAGE NO.: Application dependent.

* = Set to N/A when data word is divided into coded fields.

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TABLE VII - Acceleration Category, Meters/Second/Second, Double Precision

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Acceleration

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	512
SIGNAL TYPE	:	2's complement	LSB	:	0.0000004768
UNITS	:	Meters/Second/Second	FULLSCALE	:	1.023999999E+3

FIELD NAME	BIT NO.	DESCRIPTION
Acceleration	MSW -00-S	Sign
	-01-N	MSB
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	Notes 1, 2
	LSW -00-N	
	-01-N	
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent

Note 1: If the resolution requirement for a particular application is coarser than or equal to 0.03125, the designer should use only one word.
Note 2: Coordinate system should be referenced.

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TABLE VIII - Acceleration Category, Feet/Second/Second

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Acceleration

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	512
SIGNAL TYPE	:	2's complement	LSB	:	0.03125
UNITS	:	Feet/Second/Second	FULLSCALE	:	1.02396875E+3

FIELD NAME	BIT NO.	DESCRIPTION
Acceleration	-00-S	Sign
	-01-N	MSB
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	Note 1
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent

Note 1: Coordinate system should be referenced.

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TABLE IX - Angular Category, Semicircles, Double Precision

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Angle

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	0.5
SIGNAL TYPE	:	2's complement	LSB	:	0.0000000005
UNITS	:	Semicircles	FULLSCALE	:	0.9999999995

FIELD NAME	BIT NO.	DESCRIPTION
Angle	MSW -00-S	Sign
	-01-N	MSB
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	Notes 1, 2
	LSW -00-N	
	-01-N	
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: Semicircle = 1 pi radian
* - Application Dependent

Note 1: If the resolution requirement for a particular application is coarser than or equal to 0.0000305176, the designer should use only one word.
Note 2: Coordinate system should be referenced.

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TABLE X - Angular Acceleration Category, Semicircles/Second/Second

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Angular Acceleration

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	4
SIGNAL TYPE	:	2's complement	LSB	:	0.000244141
UNITS	:	Semicircles/Second/Second	FULLSCALE	:	7.999755859

FIELD NAME	BIT NO.	DESCRIPTION
Angular Acceleration	-00-S	Sign
	-01-N	MSB
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	Note 1
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: Semicircle = 1 pi radian
* - Application Dependent

Note 1: Coordinate system should be referenced.

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TABLE XI - Angular Velocity Category, Semicircles/Second, Double Precision

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Angular Velocity

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	2
SIGNAL TYPE	:	2's complement	LSB	:	1.8626E-9
UNITS	:	Semicircles/Second	FULLSCALE	:	3.999999998

FIELD NAME	BIT NO.	DESCRIPTION
Angular Velocity	MSW -00-S	Sign
	-01-N	MSB
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	Notes 1, 2
	LSW -00-N	
	-01-N	
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: Semicircle = 1 pi radian
* - Application Dependent

Note 1: If the resolution requirement for a particular application is coarser than or equal to 0.0001220703, the designer should use only one word.
Note 2: Coordinate system should be referenced.

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TABLE XII - ASCII Data Category (Character)

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Character

WORD ID	:	*	MAX VALUE	:	N/A
SOURCE(S)	:	*	MIN VALUE	:	N/A
DEST(S)	:	*	RESOLUTION	:	N/A
COMP RATE	:	*	ACCURACY	:	N/A
XMIT RATE	:	*	MSB	:	N/A
SIGNAL TYPE	:	ASCII	LSB	:	N/A
UNITS	:	N/A	FULLSCALE	:	N/A

FIELD NAME	BIT NO.	DESCRIPTION
Character N	-00-A	MSB
	-01-A	
	-02-A	
	-03-A	
	-04-A	Note 1
	-05-A	
	-06-A	
	-07-A	LSB
Character N + 1	-08-A	MSB
	-09-A	
	-10-A	
	-11-A	
	-12-A	Note 1
	-13-A	
	-14-A	
	-15-A	LSB

REMARKS: * - Application Dependent

Note 1: In standard 7-bit ASCII the first bit of each character field (MSB) shall be set to logic zero (0), and the 7-bit ASCII code shall occupy the remaining seven bits of the field.

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TABLE XIII - BCD Data Category (Channel Select)

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME: Channel Select

WORD ID	:	*	MAX VALUE	:	N/A
SOURCE(S)	:	*	MIN VALUE	:	N/A
DEST(S)	:	*	RESOLUTION	:	N/A
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	N/A
SIGNAL TYPE	:	NBCD	LSB	:	N/A
UNITS	:	N/A	FULLSCALE	:	N/A

FIELD NAME	BIT NO.	DESCRIPTION
Channel Select Thousands Digit	-00-B	MSB
	-01-B	MAX VALUE = 9
	-02-B	MIN VALUE = 0
	-03-B	LSB
Channel Select Hundreds Digit	-04-B	MSB
	-05-B	MAX VALUE = 9
	-06-B	MIN VALUE = 0
	-07-B	LSB
Channel Select Tens Digit	-08-B	MSB
	-09-B	MAX VALUE = 9
	-10-B	MIN VALUE = 0
	-11-B	LSB
Channel Select Ones Digit	-12-B	MSB
	-13-B	MAX VALUE = 9
	-14-B	MIN VALUE = 0
	-15-B	LSB

REMARKS: * - Application Dependent

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TABLE XIV - Convergence Factor Category

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Convergence Factor

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	1
SIGNAL TYPE	:	Unsigned Numeric	LSB	:	0.000030518
UNITS	:	N/A	FULLSCALE	:	1.999969482

FIELD NAME	BIT NO.	DESCRIPTION
Convergence Factor	-00-N	MSB
	-01-N	
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent

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TABLE XV - Cosine/Sine Category, Double Precision

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Cosine/Sine

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	0.5
SIGNAL TYPE	:	2's complement	LSB	:	4.6566E-10
UNITS	:	N/A	FULLSCALE	:	0.999999995

FIELD NAME	BIT NO.	DESCRIPTION
Cosine/Sine	MSW -00-S	Sign
	-01-N	MSB ----------
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	Notes 1, 2
	LSW -00-N	
	-01-N	
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB ----------

REMARKS: * - Application Dependent

Note 1: If the resolution requirement for a particular application is coarser than or equal to 0.0000305176, the designer should use only one word.
Note 2: Coordinate system should be referenced.

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TABLE XVI - Counts Category (Signed)

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Counts

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	16,384
SIGNAL TYPE	:	2's complement	LSB	:	1
UNITS	:	*	FULLSCALE	:	32,767

FIELD NAME	BIT NO.	DESCRIPTION
Counts	-00-S	Sign
	-01-N	MSB
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent

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TABLE XVII - Counts Category (Unsigned)

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Counts

WORD ID	: *		MAX VALUE	: *	
SOURCE(S)	: *		MIN VALUE	: *	
DEST(S)	: *		RESOLUTION	: *	
COMP RATE	: *		ACCURACY	: *	
XMIT RATE	: *		MSB	: 32,768	
SIGNAL TYPE	: Unsigned Numeric		LSB	: 1	
UNITS	: *		FULLSCALE	: 65,535	

FIELD NAME	BIT NO.	DESCRIPTION
Counts	-00-N	MSB
	-01-N	
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent

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TABLE XVIII - Data Validity Category (Checksum)

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Checksum

WORD ID	:	*	MAX VALUE	:	N/A
SOURCE(S)	:	*	MIN VALUE	:	N/A
DEST(S)	:	*	RESOLUTION	:	N/A
COMP RATE	:	*	ACCURACY	:	N/A
XMIT RATE	:	*	MSB	:	N/A
SIGNAL TYPE	:	Unsigned Numeric	LSB	:	N/A
UNITS	:	N/A	FULLSCALE	:	N/A

FIELD NAME	BIT NO.	DESCRIPTION
Checksum	-00-N	MSB
	-01-N	
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	Note 1
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent

Note 1: The checksum word consists of the arithmetic sum, without regard to overflows, of a selected group of data words. More than one checksum word may be used, if required.

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TABLE XIX - Data Validity Category (Error Protection)

DOC. NO. * REV. *
DATE *
SHEET 1 OF 2

WORD NAME : Error Protection

WORD ID	:	*	MAX VALUE	:	N/A
SOURCE(S)	:	*	MIN VALUE	:	N/A
DEST(S)	:	*	RESOLUTION	:	N/A
COMP RATE	:	*	ACCURACY	:	N/A
XMIT RATE	:	*	MSB	:	N/A
SIGNAL TYPE	:	Coded (BCH 31,16,3)	LSB	:	N/A
UNITS	:	N/A	FULLSCALE	:	N/A

FIELD NAME	BIT NO.	DESCRIPTION
Error Protection Word	-00-C	MSB
	-01-C	
	-02-C	
	-03-C	
	-04-C	
	-05-C	
	-06-C	
	-07-C	Notes 1,2,3,4
	-08-C	
	-09-C	
	-10-C	
	-11-C	
	-12-C	
	-13-C	
	-14-C	LSB
	-15-0	

REMARKS: * - Application Dependent

Note 1: Other methods of error protection (detection and correction) are available for use. The use of other methods of error protection may cause system integration problems. First, certain error protection methods, such as CRC, may be susceptible to single point failures or other reliability problems. Secondly, a multiplicity of encoding standards will unnecessarily complicate the encoder/ decoder function. Therefore, the use of BCH (31,16,3) is recommended for error protection.

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TABLE XIX - Data Validity Category (Error Protection) - Continued

DOC. NO. * REV. *
DATE *
SHEET 2 OF 2

WORD NAME : Error Protection

Note 2: Number of errors required to be detected/corrected is application dependent.

Note 3: The BCH generating polynomial is:

$$G(X)=X^{15}+X^{11}+X^{10}+X^{9}+X^{8}+X^{7}+X^{5}+X^{3}+X^{2}+X+1,$$

where X^{15} indicates the MSB of the 16-bit data word field. BCH (31,16,3) indicates a 31-bit field, with 16 information bits and 15 check bits, which provide for error correction of 3 bits.

Note 4: The Error Protection Word shall immediately follow the data word to be protected. If multiword parameters are to be protected, the Error Protection Word will follow contiguously each 16-bit protected data word (e.g., Protected Data Word 1, Error Protection Word 1; Protected Data Word 2, Error Protection Word 2; etc.).

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TABLE XX - Deviation Category, DDM

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Deviation

WORD ID	:	*	MAX VALUE	:	Note 1
SOURCE(S)	:	*	MIN VALUE	:	Note 1
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	0.5
SIGNAL TYPE	:	2's complement	LSB	:	0.0000305176
UNITS	:	DDM	FULLSCALE	:	0.9999969483

FIELD NAME	BIT NO.	DESCRIPTION
Deviation	-00-S	Sign
	-01-N	MSB
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	Note 2
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: DDM = Difference in Depth of Modulation
* - Application Dependent

Note 1: Range for localizer signals is ±0.4 DDM.
Range for glideslope deviation is ±0.8 DDM.
Note 2: Positive values of localizer data indicate a fly-right command.
Positive values of glideslope data indicate a fly-down command.

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TABLE XXI - Distance Category, Meters, Double Precision

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Distance

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	16,384
SIGNAL TYPE	:	2's complement	LSB	:	0.0000152588
UNITS	:	Meters	FULLSCALE	:	3.27679999E+4

FIELD NAME	BIT NO.	DESCRIPTION
Distance	MSW -00-S	Sign
	-01-N	MSB ----------
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	Notes 1,2
	LSW -00-N	
	-01-N	
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB ----------

REMARKS: * - Application Dependent

Note 1: If the resolution requirement for a particular application is coarser than or equal to 1, the designer should use only one word.
Note 2: Coordinate system should be referenced.

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TABLE XXII - Distance Category, Feet, Double Precision

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Distance

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	16,777,216
SIGNAL TYPE	:	2's complement	LSB	:	0.015625
UNITS	:	Feet	FULLSCALE	:	3.35544319E+7

FIELD NAME	BIT NO.	DESCRIPTION
Distance	MSW -00-S	Sign
	-01-N	MSB
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	Notes 1,2
	LSW -00-N	
	-01-N	
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent

Note 1: If the resolution requirement for a particular application is coarser than or equal to 1,024, the designer should use only one word.
Note 2: Coordinate system should be referenced.

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TABLE XXIII - Distance Category, Kilometers, Double Precision

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Distance

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	16,384
SIGNAL TYPE	:	2's complement	LSB	:	0.000015258
UNITS	:	Kilometers	FULLSCALE	:	3.27679999E+4

FIELD NAME	BIT NO.	DESCRIPTION
Distance	MSW -00-S	Sign
	-01-N	MSB
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	Notes 1,2
	LSW -00-N	
	-01-N	
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent

Note 1: If the resolution requirement for a particular application is coarser than or equal to 1, the designer should use only one word.
Note 2: Coordinate system should be referenced.

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TABLE XXIV - Distance Category, Nautical Miles (Low Range)

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Distance

WORD ID	: *		MAX VALUE	: *	
SOURCE(S)	: *		MIN VALUE	: *	
DEST(S)	: *		RESOLUTION	: *	
COMP RATE	: *		ACCURACY	: *	
XMIT RATE	: *		MSB	: 256	
SIGNAL TYPE	: 2's complement		LSB	: 0.015625	
UNITS	: Nautical Miles		FULLSCALE	: 5.11984375E+2	

FIELD NAME	BIT NO.	DESCRIPTION
Distance	-00-S	Sign
	-01-N	MSB
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent

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TABLE XXV - Distance Category, Nautical Miles (High Range), Double Precision

DOS. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Distance

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	4,096
SIGNAL TYPE	:	2's complement	LSB	:	0.0000038147
UNITS	:	Nautical Miles	FULLSCALE	:	8.19199999E+3

FIELD NAME	BIT NO.	DESCRIPTION
Distance	MSW -00-S	Sign
	-01-N	MSB
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	Note 1
	LSW -00-N	
	-01-N	
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent

Note 1: If the resolution requirement for a particular application is coarser than or equal to 0.25, the designer should use only one word.

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TABLE XXVI - Flow Category, Kilograms/Hour (Low Range)

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Flow

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	32,768
SIGNAL TYPE	:	2's complement	LSB	:	2
UNITS	:	Kilograms/Hour	FULLSCALE	:	65,534

FIELD NAME	BIT NO.	DESCRIPTION
Flow	-00-S	Sign
	-01-N	MSB ----------
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB ----------

REMARKS: * - Application Dependent

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TABLE XXVII - Flow Category, Kilograms/Minute (High Range)

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Flow

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	32,768
SIGNAL TYPE	:	2's complement	LSB	:	2
UNITS	:	Kilograms/Minute	FULLSCALE	:	65,534

FIELD NAME	BIT NO.	DESCRIPTION
Flow	-00-S	Sign
	-01-N	MSB
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent

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TABLE XXVIII - Frequency Category, Hertz (Four Words)

DOC. NO. * REV. *
DATE *
SHEET 1 OF 4

WORD NAME : Frequency

WORD ID	:	*	MAX VALUE	:	N/A
SOURCE(S)	:	*	MIN VALUE	:	N/A
DEST(S)	:	*	RESOLUTION	:	N/A
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	N/A
SIGNAL TYPE	:	NBCD	LSB	:	N/A
UNITS	:	Hertz	FULLSCALE	:	N/A

FIELD NAME	BIT NO.	DESCRIPTION
Frequency (1,000 GHz)	-00-B	MSB
	-01-B	
		LSB = 1 X 10^{12} Hz (1,000 GHz)
	-02-B	
	-03-B	LSB
Frequency (100 GHz)	-04-B	MSB
	-05-B	
		LSB = 1 X 10^{11} Hz (100 GHz)
	-06-B	
	-07-B	LSB
Frequency (10 GHz)	-08-B	MSB
	-09-B	
		LSB = 1 X 10^{10} Hz (10 GHz)
	-10-B	
	-11-B	LSB
Frequency (1 GHz)	-12-B	MSB
	-13-B	
		LSB = 1 X 10^{9} Hz (1 GHz)
	-14-B	
	-15-B	LSB

REMARKS: * - Application Dependent

Four-word quantity--word 1 of 4.

Any contiguous grouping (e.g., 1, 2) can be used to create a frequency data block.

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TABLE XXVIII - Frequency Category, Hertz (Four Words) - Continued

DOC. NO. * REV. *
DATE *
SHEET 2 OF 4

WORD NAME : Frequency

WORD ID	:	*	MAX VALUE	:	N/A
SOURCE(S)	:	*	MIN VALUE	:	N/A
DEST(S)	:	*	RESOLUTION	:	N/A
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	N/A
SIGNAL TYPE	:	NBCD	LSB	:	N/A
UNITS	:	Hertz	FULLSCALE	:	N/A

FIELD NAME	BIT NO.	DESCRIPTION
Frequency (100 MHz)	-00-B	MSB
	-01-B	
		LSB = 1 X 10^8 Hz (100 MHz)
	-02-B	
	-03-B	LSB
Frequency (10 MHz)	-04-B	MSB
	-05-B	
		LSB = 1 X 10^7 Hz (10 MHz)
	-06-B	
	-07-B	LSB
Frequency (1 MHz)	-08-B	MSB
	-09-B	
		LSB = 1 X 10^6 Hz (1 MHz)
	-10-B	
	-11-B	LSB
Frequency (100 kHz)	-12-B	MSB
	-13-B	
		LSB = 1 X 10^5 Hz (100 kHz)
	-14-B	
	-15-B	LSB

REMARKS: * - Application Dependent

Four-word quantity--word 2 of 4.

Any contiguous grouping (e.g., 1, 2) can be used to create a frequency data block.

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TABLE XXVIII - Frequency Category, Hertz (Four Words) - Continued

DOC. NO. * REV. *
DATE *
SHEET 3 OF 4

WORD NAME : Frequency

WORD ID	:	*	MAX VALUE	:	N/A
SOURCE(S)	:	*	MIN VALUE	:	N/A
DEST(S)	:	*	RESOLUTION	:	N/A
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	N/A
SIGNAL TYPE	:	NBCD	LSB	:	N/A
UNITS	:	Hertz	FULLSCALE	:	N/A

FIELD NAME	BIT NO.	DESCRIPTION
Frequency (10 kHz)	-00-B	MSB
	-01-B	
		LSB = 1 X 10^4 Hz (10 kHz)
	-02-B	
	-03-B	LSB
Frequency (1 kHz)	-04-B	MSB
	-05-B	
		LSB = 1 X 10^3 Hz (1 kHz)
	-06-B	
	-07-B	LSB
Frequency (100 Hz)	-08-B	MSB
	-09-B	
		LSB = 1 X 10^2 Hz (100 Hz)
	-10-B	
	-11-B	LSB
Frequency (10 Hz)	-12-B	MSB
	-13-B	
		LSB = 10 Hz
	-14-B	
	-15-B	LSB

REMARKS: * - Application Dependent

Four-word quantity--word 3 of 4.

Any contiguous grouping (e.g., 1, 2) can be used to create a frequency data block.

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TABLE XXVIII - Frequency Category, Hertz (Four Words) - Continued

DOC. NO. * REV. *
DATE *
SHEET 4 OF 4

WORD NAME : Frequency

WORD ID	:	*	MAX VALUE	:	N/A
SOURCE(S)	:	*	MIN VALUE	:	N/A
DEST(S)	:	*	RESOLUTION	:	N/A
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	N/A
SIGNAL TYPE	:	NBCD	LSB	:	N/A
UNITS	:	Hertz	FULLSCALE	:	N/A

FIELD NAME	BIT NO.	DESCRIPTION
Frequency (1 Hz)	-00-B	MSB
	-01-B	
		LSB = 1 Hz
	-02-B	
	-03-B	LSB
Frequency (0.1 Hz)	-04-B	MSB
	-05-B	
		LSB = 1 X 10^{-1} Hz (0.1 Hz)
	-06-B	
	-07-B	LSB
Frequency (0.01 Hz)	-08-B	MSB
	-09-B	
		LSB = 1 X 10^{-2} Hz (0.01 Hz)
	-10-B	
	-11-B	LSB
Frequency (0.001 Hz)	-12-B	MSB
	-13-B	

REMARKS: * - Application Dependent

Four-word quantity--word 4 of 4.

Any contiguous grouping (e.g., 1, 2) can be used to create a frequency data block.

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TABLE XXIX - Frequency Category, Kilohertz (ADF)

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : ADF, Low Frequency

WORD ID	*	MAX VALUE	N/A
SOURCE(S)	*	MIN VALUE	N/A
DEST(S)	*	RESOLUTION	N/A
COMP RATE	*	ACCURACY	N/A
XMIT RATE	*	MSB	N/A
SIGNAL TYPE	Coded, NBCD	LSB	N/A
UNITS	Kilohertz	FULLSCALE	N/A

FIELD NAME	BIT NO.	DESCRIPTION	
Thousands digit	-00-C	MSB ------1=2000.0 kHz	
	-01-C	LSB ------1=1000.0 kHz	
Hundreds Digit	-02-B	MSB ------1= 800.0 kHz	
	-03-B	1= 400.0 kHz	Note 1
	-04-B	1= 200.0 kHz	
	-05-B	LSB ------1= 100.0 kHz	
Tens Digit	-06-B	MSB ------1= 80.0 kHz	
	-07-B	1= 40.0 kHz	Note 1
	-08-B	1= 20.0 kHz	
	-09-B	LSB ------1= 10.0 kHz	
Ones Digit	-10-B	MSB ------1= 8.0 kHz	
	-11-B	1= 4.0 kHz	Note 1
	-12-B	1= 2.0 kHz	
	-13-B	LSB ------1= 1.0 kHz	
Tenths Digit	-14-D	1= 0.5 kHz	
	-15-0	Not used	

REMARKS: * - Application Dependent

Note 1: Valid range 0000-1001 (binary).

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TABLE XXX - Frequency Category, Megahertz (VHF/UHF)

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : VHF/UHF Frequency

WORD ID	: *	MAX VALUE	: N/A
SOURCE(S)	: *	MIN VALUE	: N/A
DEST(S)	: *	RESOLUTION	: N/A
COMP RATE	: *	ACCURACY	: N/A
XMIT RATE	: *	MSB	: N/A
SIGNAL TYPE	: Coded, NBCD	LSB	: N/A
UNITS	: Megahertz	FULLSCALE	: N/A

FIELD NAME	BIT NO.	DESCRIPTION
Hundreds digit	-00-C	MSB ------1 = 200.0 MHz----------
	-01-C	LSB ------1 = 100.0 MHz----------
Tens Digit	-02-B	MSB ------1 = 80.0 MHz----------
	-03-B	1 = 40.0 MHz Note 1
	-04-B	1 = 20.0 MHz
	-05-B	LSB ------1 = 10.0 MHz----------
Ones Digit	-06-B	MSB ------1 = 8.0 MHz----------
	-07-B	1 = 4.0 MHz Note 1
	-08-B	1 = 2.0 MHz
	-09-B	LSB ------1 = 1.0 MHz----------
Tenths Digit	-10-B	MSB ------1 = 0.8 MHz----------
	-11-B	1 = 0.4 MHz Note 1
	-12-B	1 = 0.2 MHz
	-13-B	LSB ------1 = 0.1 MHz----------
Hundredths Digit	-14-C	MSB ------1 = 0.050 MHz----------
	-15-C	LSB ------1 = 0.025 MHz----------

REMARKS: * - Application Dependent

Note 1: Valid range 0000-1001 (binary).

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TABLE XXXI - Mass Category, Kilograms (Low Range)

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Mass

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	2,048
SIGNAL TYPE	:	2's complement	LSB	:	0.125
UNITS	:	Kilograms	FULLSCALE	:	4.095875E+3

FIELD NAME	BIT NO.	DESCRIPTION
Mass	-00-S	Sign
	-01-N	MSB
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent

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TABLE XXXII - Mass Category, Kilograms (High Range)

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Mass

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	262,144
SIGNAL TYPE	:	2's complement	LSB	:	16
UNITS	:	Kilogram	FULLSCALE	:	524,272

FIELD NAME	BIT NO.	DESCRIPTION
Mass	-00-S	Sign
	-01-N	MSB
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent

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TABLE XXXIII - MGRS Category (Five Words)

DOC. NO. * REV. *
DATE *
SHEET 1 OF 11

WORD NAME : MGRS

WORD ID	:	*	MAX VALUE	:	N/A
SOURCE(S)	:	*	MIN VALUE	:	N/A
DEST(S)	:	*	RESOLUTION	:	N/A
COMP RATE	:	*	ACCURACY	:	N/A
XMIT RATE	:	*	MSB	:	N/A
SIGNAL TYPE	:	Coded, ASCII	LSB	:	N/A
UNITS	:	N/A	FULLSCALE	:	N/A

FIELD NAME	BIT NO.	DESCRIPTION
Ellipsoid/Datum ID	-00-C	MSB
	-01-C	Most Significant Character
	-02-C	Notes 1,3
	-03-C	LSB
Ellipsoid/Datum ID	-04-C	MSB
	-05-C	Least Significant Character
	-06-C	Notes 1,3
	-07-C	LSB
MGRS Grid Zone	-08-A	MSB
	-09-A	
	-10-A	
	-11-A	Column Number
	-12-A	Most Significant Digit
	-13-A	Note 2
	-14-A	
	-15-A	LSB

REMARKS: * - Application Dependent
FORMAT I

Five-word quantity — word 1 of 5.

Note 1: Hexadecimal or BCD values are valid.
Note 2: Column Number range: 1 to 60 (decimal).

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TABLE XXXIII - MGRS Category (Five Words) - Continued

DOC. NO. * REV. *
DATE *
SHEET 2 OF 11

WORD NAME : MGRS

WORD ID	:	*	MAX VALUE	:	N/A
SOURCE(S)	:	*	MIN VALUE	:	N/A
DEST(S)	:	*	RESOLUTION	:	N/A
COMP RATE	:	*	ACCURACY	:	N/A
XMIT RATE	:	*	MSB	:	N/A
SIGNAL TYPE	:	ASCII	LSB	:	N/A
UNITS	:	N/A	FULLSCALE	:	N/A

FIELD NAME	BIT NO.	DESCRIPTION
Spare	-00-0	Always set to zero
Datum ID	-01-A	MSB ----------
	-02-A	Most Significant Character Note 3
	-03-A	
	-04-A	
	-05-A	
	-06-A	
	-07-A	LSB ----------
Spare	-08-0	Always set to zero
Datum ID	-09-A	MSB ----------
	-10-A	Least Significant Character Note 3
	-11-A	
	-12-A	
	-13-A	
	-14-A	
	-15-A	LSB ----------

REMARKS: * - Application Dependent
FORMAT II

Five-word quantity — word 1 of 5.

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TABLE XXXIII - MGRS Category (Five Words) - Continued

WORD NAME : MGRS

Note 3:

ELLIPSOID	ID	DATUM
	20	USER ENTERED
AIRY	30	ORDINANCE SURVEY OF GREAT BRITAIN 1936
AUSTRALIAN NATIONAL	03	AUSTRALIAN GEODETIC 1984
BESSEL	04	BUKIT RIMPAH
	06	DJAKARTA
	11	GUNUNG SEGARA
	39	TIMBALAI
	40	TOKYO
	44	SPECIAL DATUM, TOKYO SPECIAL
CLARKE 1866	10	GUAM 1963
	21	LUZON
	25	NORTH AMERICA 1927 (CONUS)
	26	NORTH AMERICA 1927 (ALASKA AND CANADA)
	27	OLD HAWAIIAN, MAUI
	28	OLD HAWAIIAN, OAHU
	29	OLD HAWAIIAN, KAUAI
	43	SPECIAL DATUM, LUZON SPECIAL
CLARKE 1880	01	ADINDAN
	02	ARC 1950
	19	LIBERIA 1964
	22	MERCHICH
	24	NIGERIA (MINNA)
EVEREST	16	INDIAN
	42	SPECIAL DATUM, INDIAN SPECIAL
	39	TIMBALAI
INTERNATIONAL	05	CAMP AREA ASTRO
	07	EUROPEAN 1950
	08	GEODETIC DATUM 1949
	13	HERAT NORTH
	14	HJORSEY 1955
	15	HU-TZU-SHAN
	31	QORNOQ
	35	SOUTH AMERICA (CAMPO INCHAUSPE)
	36	SOUTH AMERICA (CHUA ASTRO)
	34	SOUTH AMERICA (CORREGO ALEGRE)
	33	SOUTH AMERICA (PROVISIONAL 1956)
	37	SOUTH AMERICA (YACARE)
	38	TANANARIVE OBSERVATORY 1925
MODIFIED AIRY	17	IRELAND 1965
MODIFIED EVEREST	18	KERTAU (MALAYAN REVISED TRIANGULATION)
WGS 72	46	WORLD GEODETIC SYSTEM 1972
WGS 84	09	GHANA
	12	GUNUNG SERINDUNG
	23	MONTJONG LOWE
	32	SIERRA LEONE 1960
	41	VOIROL
	45	SPECIAL DATUM, WORLD GEODETIC SYSTEM 1984
	47	WORLD GEODETIC SYSTEM 1984 (DEFAULT DATUM)

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TABLE XXXIII - MGRS Category (Five Words) - Continued

DOC. NO. * REV. *
DATE *
SHEET 4 OF 11

WORD NAME : MGRS

WORD ID	:	*	MAX VALUE	:	N/A
SOURCE(S)	:	*	MIN VALUE	:	N/A
DEST(S)	:	*	RESOLUTION	:	N/A
COMP RATE	:	*	ACCURACY	:	N/A
XMIT RATE	:	*	MSB	:	N/A
SIGNAL TYPE	:	ASCII	LSB	:	N/A
UNITS	:	N/A	FULLSCALE	:	N/A

FIELD NAME	BIT NO.	DESCRIPTION
MGRS Grid Zone	-00-A	MSB
	-01-A	
	-02-A	
	-03-A	Column Number
	-04-A	Least Significant Digit
	-05-A	Note 1
	-06-A	
	-07-A	LSB
MGRS Grid Zone	-08-A	MSB
	-09-A	
	-10-A	
	-11-A	Row Letter
	-12-A	
	-13-A	
	-14-A	
	-15-A	LSB

REMARKS: * - Application Dependent
FORMAT I

Five-word quantity — word 2 of 5.

Note 1: Column Number range: 1 to 60 (decimal)

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TABLE XXXIII - MGRS Category (Five Words) - Continued

DOC. NO. * REV. *
DATE *
SHEET 5 OF 11

WORD NAME : MGRS

WORD ID	:	*	MAX VALUE	:	N/A
SOURCE(S)	:	*	MIN VALUE	:	N/A
DEST(S)	:	*	RESOLUTION	:	N/A
COMP RATE	:	*	ACCURACY	:	N/A
XMIT RATE	:	*	MSB	:	N/A
SIGNAL TYPE	:	NBCD, ASCII	LSB	:	N/A
UNITS	:	N/A	FULLSCALE	:	N/A

FIELD NAME	BIT NO.	DESCRIPTION
Grid Zone (MSD)	-00-B	MSB
	-01-B	MAX VALUE = 6
		MIN VALUE = 0
	-02-B	NOTE 1
	-03-B	LSB
Grid Zone (LSD)	-04-B	MSB
	-05-B	MAX VALUE = 9
		MIN VALUE = 0
	-06-B	NOTE 1
	-07-B	LSB
Spare	-08-0	Always set to zero
Grid Zone	-09-A	MSB
	-10-A	
	-11-A	MAX VALUE = X
		MIN VALUE = C
	-12-A	NOTE 2
	-13-A	
	-14-A	
	-15-A	LSB

REMARKS: * - Application Dependent
FORMAT II

Five-word quantity — word 2 of 5.

Note 1: Inputs shall be limited to values between 00 and 60 inclusive.
Note 2: Characters I and O are not used.

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TABLE XXXIII - MGRS Category (Five Words) - Continued

DOC. NO. * REV. *
DATE *
SHEET 6 OF 11

WORD NAME : MGRS

WORD ID	:	*	MAX VALUE	:	N/A
SOURCE(S)	:	*	MIN VALUE	:	N/A
DEST(S)	:	*	RESOLUTION	:	N/A
COMP RATE	:	*	ACCURACY	:	N/A
XMIT RATE	:	*	MSB	:	N/A
SIGNAL TYPE	:	ASCII	LSB	:	N/A
UNITS	:	N/A	FULLSCALE	:	N/A

FIELD NAME	BIT NO.	DESCRIPTION
MGRS Grid Square	-00-A	MSB
	-01-A	
	-02-A	
	-03-A	Column Letter Most Significant Character
	-04-A	
	-05-A	
	-06-A	
	-07-A	LSB
MGRS Grid Square	-08-A	MSB
	-09-A	
	-10-A	
	-11-A	Row Letter Least Significant Character
	-12-A	
	-13-A	
	-14-A	
	-15-A	LSB

REMARKS: * - Application Dependent
FORMAT I

Five-word quantity — word 3 of 5.

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TABLE XXXIII - MGRS Category (Five Words) - Continued

DOC. NO. * REV. *
DATE *
SHEET 7 OF 11

WORD NAME : MGRS

WORD ID	: *		MAX VALUE	:	N/A
SOURCE(S)	: *		MIN VALUE	:	N/A
DEST(S)	: *		RESOLUTION	:	N/A
COMP RATE	: *		ACCURACY	:	N/A
XMIT RATE	: *		MSB	:	N/A
SIGNAL TYPE	: ASCII		LSB	:	N/A
UNITS	: N/A		FULLSCALE	:	N/A

FIELD NAME	BIT NO.	DESCRIPTION
Spare	-00-0	Always set to zero
MGRS Area Column Designator	-01-A	MSB
	-02-A	
	-03-A	
	-04-A	MAX VALUE = Z MIN VALUE = A
	-05-A	Note 1
	-06-A	
	-07-A	LSB
Spare	-08-0	Always set to zero
MGRS Grid Square Row Designator	-09-A	MSB
	-10-A	
	-11-A	MAX VALUE = V MIN VALUE = A
	-12-A	Note 1
	-13-A	
	-14-A	
	-15-A	LSB

REMARKS: * - Application Dependent
FORMAT II

Five-word quantity — word 3 of 5.

Note 1: Characters I and O are not used.

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TABLE XXXIII - MGRS Category (Five Words) - Continued

DOC. NO. REV. *
DATE *
SHEET 8 OF 11

WORD NAME : MGRS

WORD ID	: *		MAX VALUE	:	99,998
SOURCE(S)	: *		MIN VALUE	:	0
DEST(S)	: *		RESOLUTION	:	*
COMP RATE	: *		ACCURACY	:	*
XMIT RATE	: *		MSB	:	65,536
SIGNAL TYPE	: Unsigned Numeric		LSB	:	2
UNITS	: Meters		FULLSCALE	:	131,070

FIELD NAME	BIT NO.	DESCRIPTION
MGRS Easting	-00-N	MSB
	-01-N	
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent
FORMAT I

Five-word quantity — word 4 of 5.

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TABLE XXXIII - MGRS Category (Five Words) - Continued

DOC. NO. REV. *
DATE *
SHEET 9 OF 11

WORD NAME : MGRS

WORD ID	: *	MAX VALUE	: N/A
SOURCE(S)	: *	MIN VALUE	: N/A
DEST(S)	: *	RESOLUTION	: N/A
COMP RATE	: *	ACCURACY	: N/A
XMIT RATE	: *	MSB	: N/A
SIGNAL TYPE	: NBCD	LSB	: N/A
UNITS	: Kilometers	FULLSCALE	: N/A

FIELD NAME	BIT NO.	DESCRIPTION
MGRS Easting Tens	-00-B	MSB
	-01-B	MAX VALUE = 9
		MIN VALUE = 0
	-02-B	
	-03-B	LSB
MGRS Easting Units	-04-B	MSB
	-05-B	MAX VALUE = 9
		MIN VALUE = 0
	-06-B	
	-07-B	LSB
MGRS Easting Tenths	-08-B	MSB
	-09-B	MAX VALUE = 9
		MIN VALUE = 0
	-10-B	
	-11-B	LSB
MGRS Easting Hundredths	-12-B	MSB
	-13-B	MAX VALUE = 9
		MIN VALUE = 0
	-14-B	
	-15-B	LSB

REMARKS: * - Application Dependent
FORMAT II

Five-word quantity — word 4 of 5.

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TABLE XXXIII - MGRS Category (Five Words) - Continued

DOC. NO. * REV. *
DATE *
SHEET 10 OF 11

WORD NAME : MGRS

WORD ID	:	*	MAX VALUE	:	99,998
SOURCE(S)	:	*	MIN VALUE	:	0
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	65,536
SIGNAL TYPE	:	Unsigned Numeric	LSB	:	2
UNITS	:	Meters	FULLSCALE	:	131,070

FIELD NAME	BIT NO.	DESCRIPTION
MGRS Northing	-00-N	MSB
	-01-N	
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent
FORMAT I

Five-word quantity — word 5 of 5.

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TABLE XXXIII - MGRS Category (Five Words) - Continued

DOC. NO. REV. *
DATE *
SHEET 11 OF 11

WORD NAME : MGRS

WORD ID	:	*	MAX VALUE	:	N/A
SOURCE(S)	:	*	MIN VALUE	:	N/A
DEST(S)	:	*	RESOLUTION	:	N/A
COMP RATE	:	*	ACCURACY	:	N/A
XMIT RATE	:	*	MSB	:	N/A
SIGNAL TYPE	:	NBCD	LSB	:	N/A
UNITS	:	Kilometers	FULLSCALE	:	N/A

FIELD NAME	BIT NO.	DESCRIPTION
MGRS Northing Tens	-00-B	MSB
	-01-B	MAX VALUE = 9
		MIN VALUE = 0
	-02-B	
	-03-B	LSB
MGRS Northing Units	-04-B	MSB
	-05-B	MAX VALUE = 9
		MIN VALUE = 0
	-06-B	
	-07-B	LSB
MGRS Northing Tenths	-08-B	MSB
	-09-B	MAX VALUE = 9
		MIN VALUE = 0
	-10-B	
	-11-B	LSB
MGRS Northing Hundredths	-12-B	MSB
	-13-B	MAX VALUE = 9
		MIN VALUE = 0
	-14-B	
	-15-B	LSB

REMARKS: * - Application Dependent
FORMAT II

Five-word quantity — word 5 of 5.

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TABLE XXXIV - Percent Category

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Percent

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	128
SIGNAL TYPE	:	2's complement	LSB	:	0.0078125
UNITS	:	N/A	FULLSCALE	:	2.55992185E+2

FIELD NAME	BIT NO.	DESCRIPTION
Percent	-00-S	Sign
	-01-N	MSB
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent

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TABLE XXXV - Pressure Category, Kilopascals, Double Precision

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Pressure

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	16,384
SIGNAL TYPE	:	2's complement	LSB	:	0.0000152588
UNITS	:	Kilopascals	FULLSCALE	:	3.27679999E+4

FIELD NAME	BIT NO.	DESCRIPTION
Pressure	MSW -00-S	Sign
	-01-N	MSB
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	Note 1
	LSW -00-N	
	-01-N	
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent

Note 1: If the resolution requirement for a particular application is coarser than or equal to 1, the designer should use only one word.

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TABLE XXXVI - Pressure Category, Inches of Mercury

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Pressure

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	64
SIGNAL TYPE	:	2's complement	LSB	:	0.00390625
UNITS	:	Inches of Mercury	FULLSCALE	:	1.27996094E+2

FIELD NAME	BIT NO.	DESCRIPTION
Pressure	-00-S	Sign
	-01-N	MSB
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent

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TABLE XXXVII - Ratio Category

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Ratio

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	1
SIGNAL TYPE	:	Unsigned Numeric	LSB	:	0.0000305176
UNITS	:	N/A	FULLSCALE	:	1.9999694824

FIELD NAME	BIT NO.	DESCRIPTION
Ratio	-00-N	MSB
	-01-N	
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent

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TABLE XXXVIII - Temperature Category, Degrees Celsius

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Temperature

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	1,024
SIGNAL TYPE	:	2's complement	LSB	:	0.0625
UNITS	:	Degrees Celsius	FULLSCALE	:	2.0479375E+3

FIELD NAME	BIT NO.	DESCRIPTION
Temperature	-00-S	Sign
	-01-N	MSB
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent

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TABLE XXXIX - Time Category (Three Words)

DOC. NO. * REV. *
DATE *
SHEET 1 OF 3

WORD NAME : Month/Day (Calendar)

WORD ID	:	*	MAX VALUE	:	N/A
SOURCE(S)	:	*	MIN VALUE	:	N/A
DEST(S)	:	*	RESOLUTION	:	N/A
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	N/A
SIGNAL TYPE	:	NBCD	LSB	:	N/A
UNITS	:	N/A	FULLSCALE	:	N/A

FIELD NAME	BIT NO.	DESCRIPTION
Month, Tens Digit	-00-0	MSB
	-01-0	MAX VALUE = 1
	-02-0	MIN VALUE = 0 Note 1
	-03-B	LSB
Month, Ones Digit	-04-B	MSB
	-05-B	MAX VALUE = 9
	-06-B	MIN VALUE = 0 Note 1
	-07-B	LSB
Day, Tens Digit	-08-0	MSB
	-09-0	MAX VALUE = 3
	-10-B	MIN VALUE = 0 Note 2
	-11-B	LSB
Day, Ones Digit	-12-B	MSB
	-13-B	MAX VALUE = 9
	-14-B	MIN VALUE = 0 Note 2
	-15-B	LSB

REMARKS: * - Application Dependent

Three-word quantity--word 1 of 3. Any contiguous grouping (e.g., 1, 2) can be used to create a time data block.

Note 1: Valid range 0 - 12 (decimal). 0 = Unused field; 1 = January, etc.
Note 2: Valid range 0 - 31 (decimal). 0 = Unused field.

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TABLE XXXIX - Time Category (Three Words) - Continued

DOC. NO. * REV. *
DATE *
SHEET 2 OF 3

WORD NAME : Hour/Minute

WORD ID	:	*	MAX VALUE	:	N/A
SOURCE(S)	:	*	MIN VALUE	:	N/A
DEST(S)	:	*	RESOLUTION	:	N/A
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	N/A
SIGNAL TYPE	:	NBCD	LSB	:	N/A
UNITS	:	N/A	FULLSCALE	:	N/A

FIELD NAME	BIT NO.	DESCRIPTION
Hour, Tens Digit	-00-0	MSB
	-01-0	MAX VALUE = 2
	-02-B	MIN VALUE = 0 Note 3
	-03-B	LSB
Hour, Ones Digit	-04-B	MSB
	-05-B	MAX VALUE = 9
	-06-B	MIN VALUE = 0 Note 3
	-07-B	LSB
Minute, Tens Digit	-08-0	MSB
	-09-B	MAX VALUE = 5
	-10-B	MIN VALUE = 0 Note 4
	-11-B	LSB
Minute, Ones Digit	-12-B	MSB
	-13-B	MAX VALUE = 9
	-14-B	MIN VALUE = 0 Note 4
	-15-B	LSB

REMARKS: * - Application Dependent

Three-word quantity--word 2 of 3. Any contiguous grouping (e.g., 1, 2) can be used to create a time data block.

Note 3: Valid range 0 - 23 (decimal).
Note 4: Valid range 0 - 59 (decimal).

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TABLE XXXIX - Time Category (Three Words) - Continued

DOC. NO. * REV. *
DATE *
SHEET 3 OF 3

WORD NAME : Second

WORD ID	:	*	MAX VALUE	:	N/A
SOURCE(S)	:	*	MIN VALUE	:	N/A
DEST(S)	:	*	RESOLUTION	:	N/A
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	N/A
SIGNAL TYPE	:	NBCD	LSB	:	N/A
UNITS	:	N/A	FULLSCALE	:	N/A

FIELD NAME	BIT NO.	DESCRIPTION
Second, Tens Digit	-00-0	MSB
	-01-B	MAX VALUE = 5
	-02-B	MIN VALUE = 0 Note 5
	-03-B	LSB
Second, Ones Digit	-04-B	MSB
	-05-B	MAX VALUE = 9
	-06-B	MIN VALUE = 0 Note 5
	-07-B	LSB
Second, Tenths Digit	-08-B	MSB
	-09-B	MAX VALUE = 9
	-10-B	MIN VALUE = 0 Note 5
	-11-B	LSB
Second, Hundredths Digit	-12-B	MSB
	-13-B	MAX VALUE = 9
	-14-B	MIN VALUE = 0 Note 5
	-15-B	LSB

REMARKS: * - Application Dependent

Three-word quantity--word 3 of 3. Any contiguous grouping (e.g., 1, 2) can be used to create a time data block.

Note 5: Valid range 00.00 - 59.99 (decimal).

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TABLE XL - Time Category (Time Tag), Microseconds, Double Precision

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Time Tag

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	2,097,152
SIGNAL TYPE	:	Unsigned Numeric	LSB	:	9.765625E-4
UNITS	:	Microseconds	FULLSCALE	:	4.19430399E+6

FIELD NAME	BIT NO.	DESCRIPTION
Time Tag	MSW -00-N	MSB
	-01-N	
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	Note 1
	LSW -00-N	
	-01-N	
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent

Note 1: If the resolution requirement for a particular application is coarser than or equal to 64, the designer should use only one word.

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TABLE XLI - Time Category (Time To), Seconds

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Time To

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	32,768
SIGNAL TYPE	:	Unsigned Numeric	LSB	:	1
UNITS	:	Seconds	FULLSCALE	:	65,535

FIELD NAME	BIT NO.	DESCRIPTION
Time to Go	-00-N	MSB
	-01-N	
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent

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TABLE XLII - Time Category, Pulse Repetition Interval

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Pulse Repetition Interval (PRI)

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	16,384
SIGNAL TYPE	:	Unsigned Numeric	LSB	:	0.5
UNITS	:	Microseconds	FULLSCALE	:	32,767.5

FIELD NAME	BIT NO.	DESCRIPTION
Pulse Repetition Interval	-00-N	MSB
	-01-N	
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent.

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TABLE XLIII - Time Category, Pulse Width

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Pulse Width

WORD ID	: *		MAX VALUE	:	*
SOURCE(S)	: *		MIN VALUE	:	*
DEST(S)	: *		RESOLUTION	:	*
COMP RATE	: *		ACCURACY	:	*
XMIT RATE	: *		MSB	:	1,638,400
SIGNAL TYPE	: Unsigned Numeric		LSB	:	50
UNITS	: Nanoseconds		FULLSCALE	:	3,276,750

FIELD NAME	BIT NO.	DESCRIPTION
Pulse Width	-00-N	MSB
	-01-N	
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent.

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TABLE XLIV - Torque Category, Newton-Meters, Double Precision

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Torque

WORD ID	: *		MAX VALUE	: *	
SOURCE(S)	: *		MIN VALUE	: *	
DEST(S)	: *		RESOLUTION	: *	
COMP RATE	: *		ACCURACY	: *	
XMIT RATE	: *		MSB	: 16,384	
SIGNAL TYPE	: 2's complement		LSB	: 0.0000152588	
UNITS	: Newton-Meters		FULLSCALE	: 3.27679999E+4	

FIELD NAME	BIT NO.	DESCRIPTION
Torque	MSW -00-S	Sign
	-01-N	MSB
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	Note 1
	LSW -00-N	
	-01-N	
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent

Note 1: If the resolution requirement for a particular application is coarser than or equal to 1, the designer should use only one word.

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TABLE XLV - Vector Word Category

DOC. NO. * REV. *
DATE *
SHEET 1 OF 2

WORD NAME : Vector Word (Asynchronous Message Demand)

WORD ID	: ******-****BC-01	MAX VALUE	: N/A
SOURCE(S)	: *	MIN VALUE	: N/A
DEST(S)	: *	RESOLUTION	: N/A
COMP RATE	: N/A	ACCURACY	: N/A
XMIT RATE	: *	MSB	: N/A
SIGNAL TYPE	: Discrete, Coded	LSB	: N/A
UNITS	: N/A	FULLSCALE	: N/A

FIELD NAME	BIT NO.	DESCRIPTION
Format Flag	-00-0	Always set to zero
Reserved	-01-0	MSB
	-02-0	Always set to 0000
	-03-0	
	-04-0	LSB
T/R	-05-D	0 = receive, 1 = transmit
Subaddress/Mode	-06-C	MSB
	-07-C	00001 to 11110 = Subaddress of transmit or receive terminal *
	-08-C	00000 or 11111 = Decode contents of mode code field as five-bit mode code
	-09-C	
	-10-C	LSB
Data Word Count/ Mode Code	-11-C	MSB
	-12-C	Number of words to be transmitted or received, Note 1*
	-13-C	Legal range 00000-11111 00000 indicates 32 data words
	-14-C	Mode Code legal values, Note 2
	-15-C	LSB

REMARKS: * - Application Dependent

This data word is to be used in conjunction with a Transmit Vector Word Mode Code.

Note 1: For RT-to-RT messages, the word count must be identical in the command word for both the transmit and receive terminals.

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TABLE XLV - Vector Word Category - Continued

DOC. NO. * REV. *
DATE *
SHEET 2 OF 2

WORD NAME : Vector Word (Asynchronous Message Demand)

Note 2:
- 00000 - Dynamic Bus Control
- 00001 - Synchronize
- 00010 - Transmit Status Word
- 00011 - Initiate Self-Test
- 00100 - Transmitter Shutdown
- 00101 - Override Transmitter Shutdown
- 00110 - Inhibit Terminal Flag Bit
- 00111 - Override Inhibit Terminal Flag Bit
- 01000 - Reset Remote Terminal
- 10000 - Transmit Vector Word
- 10001 - Synchronize
- 10010 - Transmit Last Command Word
- 10011 - Transmit BIT Word
- 10100 - Selected Transmitter Shutdown
- 10101 - Override Selected Transmitter Shutdown

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TABLE XLV - Vector Word Category - Continued

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Vector Word (Asynchronous Action Demand)

WORD ID	******-****BC-01	MAX VALUE	N/A
SOURCE(S)	*	MIN VALUE	N/A
DEST(S)	*	RESOLUTION	N/A
COMP RATE	N/A	ACCURACY	N/A
XMIT RATE	*	MSB	N/A
SIGNAL TYPE	Discrete, Coded	LSB	N/A
UNITS	N/A	FULLSCALE	N/A

FIELD NAME	BIT NO.	DESCRIPTION
Format Flag	-00-1	Always set to logic one
Notification Flag	-01-C	User defined
	-02-C	User defined
	-03-C	User defined
	-04-C	User defined
	-05-C	User defined
	-06-C	User defined
	-07-C	User defined
	-08-C	User defined
	-09-C	User defined
	-10-C	User defined
	-11-C	User defined
	-12-C	User defined
	-13-C	User defined
	-14-C	User defined
	-15-C	User defined

REMARKS: * - Application Dependent

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TABLE XLVI - Velocity Category, Meters/Second, Double Precision

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Velocity

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	4,096
SIGNAL TYPE	:	2's complement	LSB	:	0.0000038147
UNITS	:	Meters/Second	FULLSCALE	:	8.1999999E+3

FIELD NAME	BIT NO.	DESCRIPTION
Velocity	MSW -00-S	Sign
	-01-N	MSB ----------
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	Notes 1,2
	LSW -00-N	
	-01-N	
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB ----------

REMARKS: * - Application Dependent

Note 1: If the resolution requirement for a particular application is coarser than or equal to 0.25, the designer should use only one word.
Note 2: Coordinate system should be referenced.

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TABLE XLVII - Velocity Category, Feet/Second, Double Precision

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Velocity

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	4,096
SIGNAL TYPE	:	2's complement	LSB	:	0.0000038147
UNITS	:	Feet/Second	FULLSCALE	:	8.19199999E+3

FIELD NAME	BIT NO.	DESCRIPTION
Velocity	MSW -00-S	Sign
	-01-N	MSB ----------
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	Notes 1,2
	LSW -00-N	
	-01-N	
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB ----------

REMARKS: * - Application Dependent

Note 1: If the resolution requirement for a particular application is coarser than or equal to 0.25, the designer should use only one word.
Note 2: Coordinate system should be referenced.

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TABLE XLVIII - Velocity Category, Kilometers/Hour

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Velocity

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	1,024
SIGNAL TYPE	:	2's complement	LSB	:	0.0625
UNITS	:	Kilometers/Hour	FULLSCALE	:	2.0479375E+3

FIELD NAME	BIT NO.	DESCRIPTION
Velocity	-00-S	Sign
	-01-N	MSB
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	Note 1
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent

Note 1: Coordinate system should be referenced.

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TABLE XLIX - Velocity Category, Knots

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Velocity

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	2,048
SIGNAL TYPE	:	2's complement	LSB	:	0.125
UNITS	:	Knots	FULLSCALE	:	4.095875E+3

FIELD NAME	BIT NO.	DESCRIPTION
Velocity	-00-S	Sign
	-01-N	MSB
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	Note 1
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent

Note 1: Coordinate system should be referenced.

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TABLE L - Velocity Category, Mach

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Velocity

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	16
SIGNAL TYPE	:	2's complement	LSB	:	0.0009765625
UNITS	:	Mach Number	FULLSCALE	:	3.19990234E+1

FIELD NAME	BIT NO.	DESCRIPTION
Velocity	-00-S	Sign
	-01-N	MSB
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent

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TABLE LI - Voltage Category, Volts, Double Precision

DOC. NO. * REV. *
DATE *
SHEET 1 OF 1

WORD NAME : Voltage

WORD ID	:	*	MAX VALUE	:	*
SOURCE(S)	:	*	MIN VALUE	:	*
DEST(S)	:	*	RESOLUTION	:	*
COMP RATE	:	*	ACCURACY	:	*
XMIT RATE	:	*	MSB	:	256
SIGNAL TYPE	:	2's complement	LSB	:	0.0000002384
UNITS	:	Volts	FULLSCALE	:	512

FIELD NAME	BIT NO.	DESCRIPTION
Voltage	MSW -00-S	Sign
	-01-N	MSB
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	Note 1
	LSW -00-N	
	-01-N	
	-02-N	
	-03-N	
	-04-N	
	-05-N	
	-06-N	
	-07-N	
	-08-N	
	-09-N	
	-10-N	
	-11-N	
	-12-N	
	-13-N	
	-14-N	
	-15-N	LSB

REMARKS: * - Application Dependent

Note 1: If the resolution requirement for a particular application is coarser than or equal to 0.015625, the designer should use only one word.

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3. MESSAGE FORMATS:

Message is defined in 15531/1553 as the transmission of a command word, status word, and data words if they are specified. For the RT-to-RT transmission, the message definition is expanded to include the two command words, the two status words, and the data words. In this standard, a message is defined to be the data words (1-32) that are part of the information transfer format. The information transfer format is defined the same as the 15531/1553B message definition. For purposes of the discussion to follow, message format is defined to mean the order and content of the data words within the information transfer formats shown in Figures 8 and 9 of AS15531 or Figures 6 and 7 of MIL-STD-1553B.

The general rules for message construction and standard Interface Control Document (ICD) message formats are included in this section.

3.1 Interface Control Document Message Presentation Format:

The ICD format required for the documentation of all messages in a 15531/1553 system is shown in Tables LIII through LXII. Figure 8 provides the detailed layout for a typical message ICD presentation sheet. Figure 9 provides an example of a completed message ICD presentation sheet. Presentation formats are provided for the following 15531/1553 transfer types:

a. BC-to-RT Transfer
b. RT-to-BC Transfer
c. RT-to-RT Transfer
d. Mode Command Without Data Word
e. Mode Command With Data Word (Transmit)
f. Mode Command With Data Word (Receive)
g. BC-to-RT Transfer, Broadcast
h. RT-to-RT Transfer, Broadcast
i. Mode Command Without Data Word, Broadcast
j. Mode Command With Data Word, Broadcast

Tables LIII through LXII are the skeleton ICD sheets. The definition of each entry is as follows:

DOC. NO.: The interface control document number.

REV.: The revision symbol for this sheet.

DATE: The calendar date of the latest revision to this sheet.

SHEET 1 OF #: This page count allows multiple pages, for extensive REMARKS.

MESSAGE NAME: The formal name selected for this message. A name that is to be used in this and other documents.

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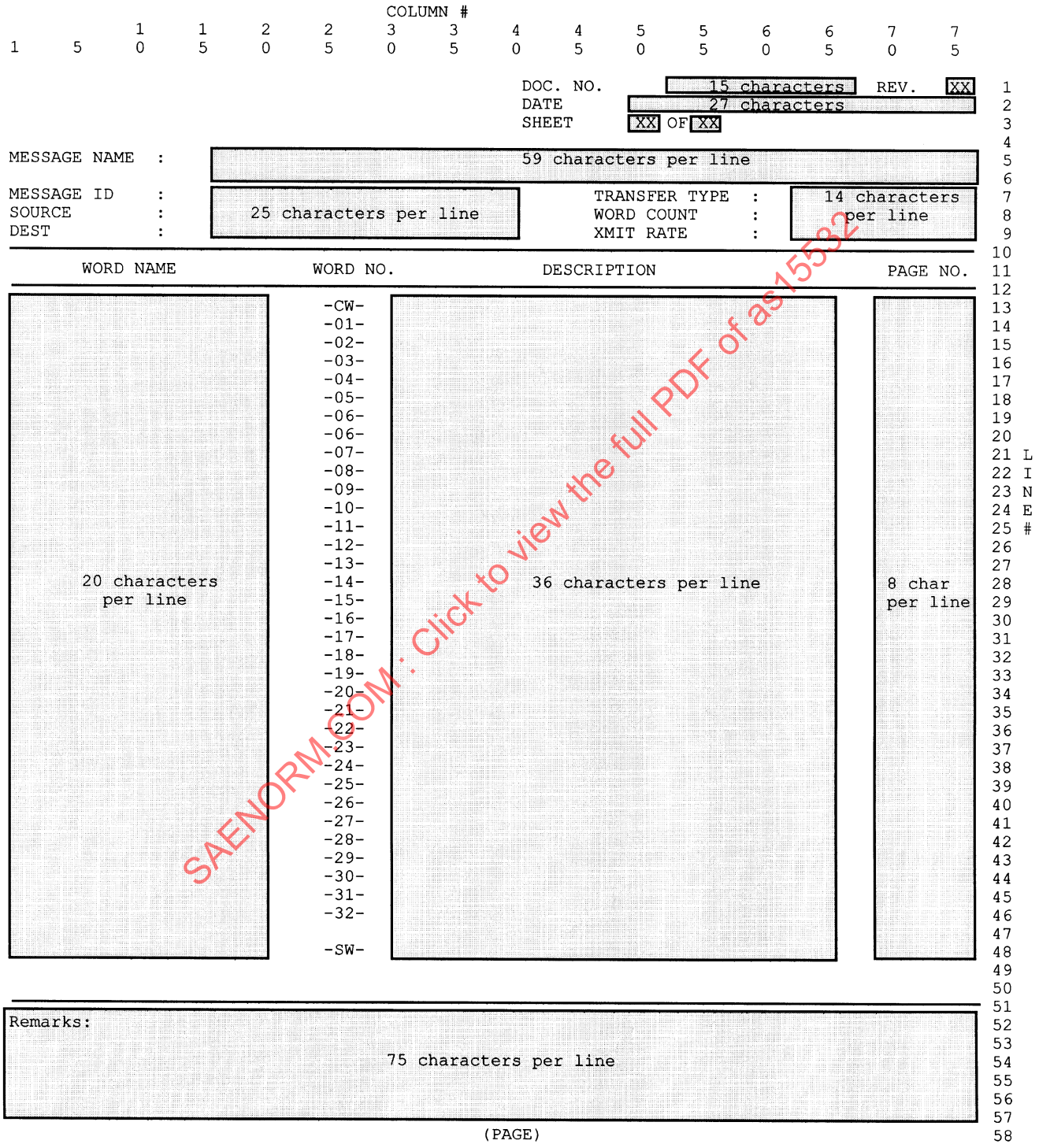

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FIGURE 8 - Message Format ICD Presentation Sheet (Sheet 1 of 4)

SPACING - MESSAGE FORMAT ICD PRESENTATION SHEET			
FIELD NAME	ROW(S)	COLUMN(S)	NO. OF CHARS
Doc No.	1	52-66	15
Rev.	1	74-75	2
Date	2	49-75	27
Sheet #	3	49-50	2
Total Sheets	3	55-56	2
Message Name	5-6	17-75	59/line
Message ID	7	17-41	25
Transfer Type	7	62-75	14
Source	8	17-41	25
Word Count	8	62-75	14
Dest	9	17-41	25
Xmit Rate	9	62-75	14
Word Name	13	1-20	20/line
Description	13	30-65	36/line
Page No.	13	68-75	8/line
Word Name	14	1-20	20/line
Description	14	30-65	36/line
Page No.	14	68-75	8/line
Word Name	15	1-20	20/line
Description	15	30-65	36/line
Page No.	15	68-75	8/line
Word Name	16	1-20	20/line
Description	16	30-65	36/line
Page No.	16	68-75	8/line
Word Name	17	1-20	20/line
Description	17	30-65	36/line
Page No.	17	68-75	8/line
Word Name	18	1-20	20/line
Description	18	30-65	36/line
Page No.	18	68-75	8/line
Word Name	19	1-20	20/line
Description	19	30-65	36/line
Page No. Word	19	68-75	8/line
Name	20	1-20	20/line
Description	20	30-65	36/line
Page No.	20	68-75	8/line
Word Name	21	1-20	20/line
Description	21	30-65	36/line
Page No. Word	21	68-75	8/line
Name	22	1-20	20/line
Description	22	30-65	36/line
Page No.	22	68-75	8/line
Word Name	23	1-20	20/line
Description	23	30-65	36/line
Page No.	23	68-75	8/line
Word Name	24	1-20	20/line
Description	24	30-65	36/line
Page No.	24	68-75	8/line
Word Name	25	1-20	20/line
Description	25	30-65	36/line
Page No.	25	68-75	8/line
Word Name	26	1-20	20/line
Description	26	30-65	36/line
Page No.	26	68-75	8/line
Word Name	27	1-20	20/line
Description	27	30-65	36/line
Page No.	27	68-75	8/line
Word Name	28	1-20	20/line
Description	28	30-65	36/line
Page No.	28	68-75	8/line
Word Name	29	1-20	20/line
Description	29	30-65	36/line
Page No.	29	68-75	8/line
Word Name	30	1-20	20/line
Description	30	30-65	36/line
Page No.	30	68-75	8/line

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FIGURE 8 - Message Format ICD Presentation Sheet (Sheet 2 of 4)

SPACING - MESSAGE FORMAT ICD PRESENTATION SHEET (cont)			
FIELD NAME	ROW(S)	COLUMN(S)	NO. OF CHARS
Word Name	31	1-20	20/line
Description	31	30-65	36/line
Page No.	31	68-75	8/line
Word Name	32	1-20	20/line
Description	32	30-65	36/line
Page No.	32	68-75	8/line
Word Name	33	1-20	20/line
Description	33	30-65	36/line
Page No.	33	68-75	8/line
Word Name	34	1-20	20/line
Description	34	30-65	36/line
Page No.	34	68-75	8/line
Word Name	35	1-20	20/line
Description	35	30-65	36/line
Page No.	35	68-75	8/line
Word Name	36	1-20	20/line
Description	36	30-65	36/line
Page No.	36	68-75	8/line
Word Name	37	1-20	20/line
Description	37	30-65	36/line
Page No.	37	68-75	8/line
Word Name	38	1-20	20/line
Description	38	30-65	36/line
Page No.	38	68-75	8/line
Word Name	39	1-20	20/line
Description	39	30-65	36/line
Page No.	39	68-75	8/line
Word Name	40	1-20	20/line
Description	40	30-65	36/line
Page No.	40	68-75	8/line
Word Name	41	1-20	20/line
Description	41	30-65	36/line
Page No.	41	68-75	8/line
Word Name	42	1-20	20/line
Description	42	30-65	36/line
Page No.	42	68-75	8/line
Word Name	43	1-20	20/line
Description	43	30-65	36/line
Page No.	43	68-75	8/line
Word Name	44	1-20	20/line
Description	44	30-65	36/line
Page No.	44	68-75	8/line
Word Name	45	1-20	20/line
Description	45	30-65	36/line
Page No.	45	68-75	8/line
Word Name	46	1-20	20/line
Description	46	30-65	36/line
Page No.	46	68-75	8/line
Word Name	47	1-20	20/line
Description	47	30-65	36/line
Page No.	47	68-75	8/line
Word Name	48	1-20	20/line
Description	48	30-65	36/line
Page No.	48	68-75	8/line
Word Name	49	1-20	20/line
Description	49	30-65	36/line
Page No.	49	68-75	8/line
Word Name	50	1-20	20/line
Description	50	30-65	36/line
Page No.	50	68-75	8/line
Remarks	52(*)-55	1-75	75/line
Page	58		

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FIGURE 8 - Message Format ICD Presentation Sheet (Sheet 3 of 4)

SPACING - MESSAGE CONTINUATION FORMAT PRESENTATION SHEET			
FIELD NAME	ROW(S)	COLUMN(S)	NO. OF CHARS
Doc No.	1	52-66	15
Rev.	1	74-75	2
Date	2	49-75	27
Sheet #	3	49-50	2
Total Sheets	3	55-56	2
Word Name	4-5	16-75	60/line
Remarks	7-56	1-75	75/line
Page	58		

FIGURE 8 - Message Format ICD Presentation Sheet (Sheet 4 of 4)

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DOC. NO. STR-DD-82009-2 REV. 0
DATE January 1982
SHEET 1 OF 1

MESSAGE NAME : Manual Groundspeed and Track Angle

MESSAGE ID : HV BC-DNS 22
SOURCE : BC
DEST : DNS
TRANSFER TYPE : BC-to-RT
WORD COUNT : 2
XMIT RATE :

WORD NAME	WORD NO.	DESCRIPTION	PAGE NO.
Receive Command Word	-CW-	To DNS subaddress 22	33
Groundspeed	-01-	HV groundspeed along HV track angle	34
Track Angle	-02-	HV track angle relative to true North	35
Receive Status Word	-SW-	From DNS	36

REMARKS:

MESSAGE DESCRIPTION:

Provides for manual entry of ground speed and track angle in the backup mode of operation. This manual entry replaces remembered velocity in the Doppler computations.

TRANSMISSION CRITERIA:

Transmitted upon operator action in the backup mode of operation.

MESSAGE FUNCTIONAL/STRUCTURAL RELATIONSHIP:

This message shall provide ground speed and track angle of the vehicle.

The system must be in the backup mode of operation (message HV BC-DNS 16) when this message is transmitted. If the ASN- 137 is not in the backup mode of operation upon receipt of message HV BC-DNS 22, the message will be ignored.

NOTE: This function will be negated upon reception of message HV BC-DNS 21.

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FIGURE 9 - Example of a Completed Message ICD Presentation Sheet