NOTE: The cover page of this standard has been changed for administrative reasons. There are no other changes to this document.

MIL-STD-188-260
1 FEBRUARY 1985

SUPERSEDING:
SEE FOREWORD

DEPARTMENT OF DEFENSE INTERFACE STANDARD

DESIGN AND ENGINEERING STANDARDS FOR TACTICAL TERMINAL SUBSYSTEMS

NO DELIVERABLE DATA
REQUIRED BY THIS DOCUMENT

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DEPARTMENT OF DEFENSE
WASHINGTON, DC 20301

Design and Engineering Standards for Tactical Terminal Subsystems

MIL-STD-188-260

1. This Military Standard is approved and mandatory for use by all Departments and Agencies of the Department of Defense in accordance with the OUSDR&E Memorandum, dated 16 August 1983 (see Appendix A).

2. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to:

Commander
U.S. Army Electronic Systems Engineering Installation Activity
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Fort Huachuca, Arizona 85613-5300

by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FOREWORD

1. Originally, Military Standard 188 (MIL-STD-188), covered tactical and long haul communications system technical standards, but later evolved into a document applicable to tactical communications only (MIL-STD-188C).

2. The Defense Communications Agency (DCA) published DCA Circulars (DCAC) promulgating standards and engineering criteria applicable to the long haul Defense Communications System (DCS) and to the technical support of the National Military Command System (NMCS).

3. As a result of a Joint Chiefs of Staff (JCS) action, standards for all military communications are now being published in MIL-STD-188 series of documents. Military communications system technical standards are subdivided into common long haul/tactical standards (MIL-STD-188-100 series), tactical standards (MIL-STD-188-200 series), and long haul standards (MIL-STD-188-300 series).

4. This document contains technical standards and design objectives for digital and analog terminal equipment employed in tactical communications systems.

5. This document supersedes paragraphs 6.2 and 6.3 of MIL-STD-188C.

IDENTIFICATION OF INTERNATIONAL STANDARDIZATION AGREEMENTS

Certain provisions of this document are the subject of international standardization agreements (STANAG 5004, STANAG 5036, STANAG 5045, and QSTAG 432). When a change notice, revision, or cancellation of this document is proposed which will affect or violate the international agreement concerned, the preparing activity shall take appropriate reconciliation action through international standardization channels, including departmental standardization offices, if required.

CONTENTS

CONTENTS (Continued)

CONTENTS (Continued)

FIGURES

TABLES

APPENDIXES

1. SCOPE

1.1 **Purpose.** This document promulgates *mandatory* system standards and optional design objectives for digital and analog terminal equipment and subsystems to ensure interoperability among terminal subsystems and between terminal subsystems and transmission subsystems that are standardized in the MIL-STD-188 series. This document also promotes compatibility and commonality among tactical terminal equipment located in a terminal subsystem. This document also establishes a level of performance for tactical terminal equipment and subsystems necessary to satisfy the requirements of a majority of users.

The technical parameters promulgated by this document represent, in general, minimum interoperability and performance characteristics. These parameters may be exceeded to satisfy specific requirements. For example, codes other than the American Standard Code for Information Interchange (ASCII) may be added to the minimum mandatory capability for ASCII, as stated in note 2 of 4.3.3.

This document is not intended to serve as a stand-alone, comprehensive reference containing all technical parameters and other details required for the design of new equipment and facilities or the preparation of specifications. Therefore, specification of characteristics such as environmental factors, size/weight limitations, connectors, cable assemblies, or power sources is outside the scope of this document. Based on specific requirements, these parameters and other design details must be carefully tailored in accordance with the policies of Department of Defense Directive (DoDD) 4120.21, Specifications and Standards Application.

Further, the establishment of technical parameters in this document is not intended to inhibit advances in communications technology. Such advances are encouraged by including nonmandatory design objectives which should be achieved, if economically feasible. In addition, such advances are facilitated by standardizing upper and lower limits rather than fixed parameter values and by avoiding specification of technology.

1.2 **Application.** This document applies to the design and development of new digital and analog terminal equipment, assemblages, and subsystems used in tactical communications systems. This document applies also to the engineering and installation of tactical terminal equipment, subsystems, and systems. Existing communication facilities are not intended to be converted immediately to comply with the standards contained in this document. However, new facilities and those undergoing major modification or rehabilitation shall comply with the standards contained in this document subject to the applicable requirements of current procurement regulations.

When standards are selected from this document, ascertain that only those standards are chosen which apply to the particular type of equipment under consideration.

Unless otherwise stated, performance parameters contained in this document do not apply to operation in an electronic warfare environment.

1.3 **Objectives.** The main objectives of this document are: (1) to ensure interoperability of tactical terminal equipment and to contribute towards interoperability of tactical subsystems and systems consistent with military requirements; (2) to provide a degree of system performance acceptable to a majority of users of tactical communications systems; and (3) to achieve the necessary degree of interoperation, performance, and compatibility in the most economical way.

These objectives will be accomplished by continuing efforts in the following areas:

a. Standardizing the characteristics of signals at various interface points between terminal equipment and transmission facilities.

b. Establishing technical parameters of terminal equipment and other factors that govern the interface characteristics with subsystems and systems in which the terminal equipment will be used.

c. Defining technical parameters of terminal equipment without specifying the technology that should be used to obtain the required performance.

An additional objective of this document is to prevent proliferation of equipment serving the same or similar function. The variety of equipment shall be the minimum necessary to effectively support the missions of the tactical forces in accordance with DoDD 4630.5, Compatibility and Commonality of Equipment for Tactical Command and Control, and Communications.

1.4 **System standards and design objectives.** The parameters and other requirements specified in this document are mandatory system standards (see Appendix A) if the word "shall" is used in connection with the parameter value or requirement under consideration. Nonmandatory design objectives are indicated by parentheses after a standardized parameter value or by the word "should" in connection with the parameter value or requirement under consideration. For a definition of the terms "system standards" and "design objective" see FED-STD-1037, Glossary of Telecommunication Terms.

2. REFERENCED DOCUMENTS

2.1 **Issues of Documents.** The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this standard to the extent specified herein.

Federal Specifications

G-C-116	Cards, Tabulating
UU-P-547	Paper, Teletypewriter, Roll
UU-T-120	Tape, Teletypewriter, Perforator

Military Specifications

MIL-P-40023	Paper, Teletypewriter, Continuous Fanfold

Federal Standards

Federal Telecommunications Standards (FED-STD)

FED-STD-1013	Telecommunications: Synchronous Signaling Rates Between Data Terminal Equipment and Data Circuit Terminating Equipment Utilizing 4 kHz Circuits
FED-STD-1037	Glossary of Telecommunication Terms

Federal Information Processing Standards (FIPS)

FIPS PUB 1	Code for Information Interchange
FIPS PUB 2	Perforated Tape Code for Information Interchange
FIPS PUB 3	Recorded Magnetic Tape for Information Interchange (800 CPI, NRZI)
FIPS PUB 13	Rectangular Holes in Twelve-row Punch Cards
FIPS PUB 14	Hollerith Punched Card Code
FIPS PUB 22	Synchronous Signaling Rates Between Data Terminal and Data Communications Equipment
FIPS PUB 25	Recorded Magnetic Tape for Information Interchange (1600 CPI, Phase Encoded)
FIPS PUB 26	One-Inch Perforated Paper Tape for Information Interchange
FIPS PUB 32	Character Sets for Optical Character Recognition (OCR)
FIPS PUB 50	Recorded Magnetic Tape for Information Interchange, 6250 CPI (246 CPMM), Group Coded Recording
FIPS PUB 89	Optical Character Recognition (OCR) Character Positioning
FIPS PUB 90	Guideline for Optical Character Recognition (OCR) Print Quality

Military Standards (MIL-STD)

MIL-STD-188	Military Communication System Technical Standards
MIL-STD-188-100	Common Long Haul and Tactical Communications Standards
MIL-STD-188-110	Equipment Technical Design Standards for Common Long Haul/-Tactical Data Modems
MIL-STD-188-114	Electrical Characteristics of Digital Interface Circuits
MIL-STD-188-124	Grounding, Bonding, and Shielding
MIL-STD-188-161	Design Standards for Common Long Haul Tactical Facsimile Equipment

MIL-STD-188-200	System Design and Engineering Standards for Tactical Communications
MIL-STD-461	Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference
MIL-STD-462	Electromagnetic Interference Characteristics, Measurement of
MIL-STD-1280	Keyboard Arrangements

Military Handbooks

MIL-HDBK-232	Military Standardization Handbook, RED/BLACK Engineering-Installation Guidelines (U)
MIL-HDBK-241	Design Guide for EMI Reduction in Power Supplies
MIL-HDBK-419	Grounding, Bonding, and Shielding for Electronics Equipments and Facilities (Vol I and II)

Publications
International Publications

STANAG 5004	Military Characteristics for Field Telephone Sets
STANAG 5036	Parameters and Practices for the use of the NATO 7-bit code
STANAG 5045	Interoperability Characteristics for Teleprinters using the NATO 7-bit Code
QSTAG 432	Standards to Achieve Interoperability of ABCA Armies' Data Transmission Code
ACP 127	Communications Instructions, Tape Relay Procedures
ACP 127, NATO Supp. 3	Message Relay Procedures

National Security Agency Publications

NACSEM 5201	TEMPEST Guidelines for Equipment/System Design (U)
NACSIM 5100	Compromising Emanations Laboratory Test Requirements, Electromagnetics (U)
NACSIM 5203	Guidelines for Facility Design and RED/BLACK Installation (U)

Department of Defense Publications

JANAP 128	Automatic Digital Network (AUTODIN) Operating Procedures

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 **Other publications.** The following documents form a part of this standard to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

American National Standards Institute (ANSI) Standards

ANSI X3.1	Synchronous Signaling Rates for Data Transmission
ANSI X3.2	Print Specifications for Magnetic Ink Character Recognition
ANSI X3.4	Code for Information Interchange
ANSI X3.6	Perforated Tape Code for Information Interchange
ANSI X3.17	Character Set for Optical Character Recognition (OCR-A)

ANSI X3.18	One-Inch Perforated Paper Tape for Information Interchange
ANSI X3.21	Rectangular Holes in 12-row Punched Cards
ANSI X3.22	Recorded Magnetic Tape for Information Interchange (800 CPI, NRZI)
ANSI X3.26	Hollerith Punched Card Code
ANSI X3.39	Recorded Magnetic Tape for Information Interchange (1600 CPI, Phase Encoded)
ANSI X3.49	Character Set for Optical Character Recognition
ANSI X3.54	Recorded Magnetic Tape for Information Interchange, 6250 CPI (246 CPMM), Group Coded Recording
ANSI X3.93M	Optical Character Recognition (OCR) Character Positioning
ANSI X3.99	Optical Character Recognition (OCR) Guidelines for OCR Print Quality

(Copies of ANSI standards may be purchased from the American National Standards Institute, 1430 Broadway, New York, NY 10018.)

3. TERMS AND DEFINITIONS

3.1 **Definitions.** Definitions of terms used in this document shall comply with the current edition of FED-STD-1037.

3.2 **Abbreviations and acronyns.** Abbreviations and acronyms used in this document are listed in Appendix B.

4. GENERAL REQUIREMENTS

4.1 **Introduction.** The configuration of terminal subsystems will vary widely, ranging from a single telephone or teletypewriter to a very complex data terminal consisting of different types of equipment for receiving, controlling, processing, displaying, and transmitting of data. It is not intended that all possible configurations of terminal subsystems be covered in this document. Instead, emphasis is placed on those parameters considered essential to ensure interoperation between terminal and transmission subsystems, among different types of equipment within a terminal subsystem, and between users and the terminal equipment. An example of a data terminal subsystem in the form of a block diagram is depicted in figure 1. Requirements for other equipment that may be located in, and form part of, a data terminal subsystem are given in subparagraph 5.4.3 of MIL-STD-188-200.

4.2 **Common requirements for data terminal equipment (DTE) and analog terminal equipment.**

4.2.1 **Electromagnetic compatibility (EMC) characteristics.** Terminal equipment shall comply with the applicable EMC requirements of the current edition of MIL-STD-461. Techniques used for the measurement and determination of EMC characteristics shall comply with the applicable requirements of the current edition of MIL-STD-462.

NOTE: MIL-HDBK-241 provides guidance for electromagnetic interference (EMI) reductions in equipment power supplies.

4.2.2 **Grounding requirements.** Terminal equipment shall comply with the applicable grounding requirements of the current edition of MIL-STD-188-124.

NOTE: MIL-HDBK-419, Grounding, Bonding, and Shielding for Electronic Equipments and Facilities, provides additional information.

4.2.3 **TEMPEST requirements.** Terminal equipment shall comply with the applicable TEMPEST requirements of the current edition of the NACSIM 5100 series.

NOTE: NACSEM 5201 provides design guidance; NACSIM 5203 and MIL-HDBK-232 provide installation guidelines for compromising emanations.

4.3 **Requirements for DTE.**

4.3.1 **Digital interface characteristics.**

4.3.1.1 **Modulation rates and data signaling rates.** The modulation rates (expressed in baud (Bd)) and the data signaling rates (expressed in bits per second (b/s)) at the interfaces shown in figure 2 shall be as listed below under items a through c. For transmission over nominal 3 kilohertz (kHz) and nominal 4 kHz voice frequency (VF) channels, only the rates specified under items a and b shall apply.

a. 50 Bd or b/s;

b. 75×2^m Bd or b/s, up to and including 9600 Bd or b/s, where m is a positive integer 0, 1, 2, ... 7;

c. The modulation rates and data signaling rates above 9600 Bd or b/s shall be 16 kBd or kb/s, or 32 kBd or kb/s.

NOTE 1: The rates in 4.3.1.1c are based on the formula 8000 x N (where N = 2, 3, 4 ...).

NOTE 2: Data signaling rates in b/s and modulation rates in Bd are the same if, *and only if*, all pulses have equal duration, all pulses occupy the complete unit interval, and binary (rather than m-ary) signaling is used.

NOTE 3: The modulation rates and data signaling rates of 4.3.1.1 for data transmission over VF channels comply with the preferred rates of FIPS PUB 22-1, with the following two exceptions:

a. The rate of 50 Bd or b/s is a DoD standard but is not a Federal standard.

b. The rate of 7200 Bd or b/s is a preferred rate in the Federal standard but has not been adopted as a DoD standard.

FIPS PUB 22-1 has also been identified as FED-STD-1013. Both Federal standards have adopted ANSI X3.1-1976 (a revision of ANSI X3.1-1968). ANSI X3.1-1976 specifies a series of signaling rates based on the formula 600 x N with a subset of preferred standard rates.

NOTE 4: It is not intended that new equipment must have the capability to operate with all modulation rates and data signaling rates specified in 4.3.1.1. Only those rates listed in 4.3.1.1 should be selected that are necessary to meet the operational requirements of the equipment under development.

NOTE 5: The series of 25×2^M contained in older MIL-STD-188 documents has been deleted.

4.3.1.2 **Electrical characteristics of digital interface.** The electrical characteristics for binary signals (data, clock, alarm, and control) at the standard interfaces (see figures 1 and 2) shall comply with the applicable requirements of the current edition of MIL-STD-188-114.

NOTE 1: In addition to the mandatory requirements of 4.3.1.2, any additional digital interface characteristics that are needed to satisfy specific requirements may be incorporated in the design of new equipment, subsystems, and systems.

NOTE 2: The low-level digital interfaces (balanced and unbalanced configurations) contained in subparagraph 4.3.1.3 of MIL-STD-188-100 have been superseded by MIL-STD-188-114.

NOTE 3: The high-level digital interface used in some existing facilities is nonstandard. Information about the high-level digital interface can be found in subparagraph 4.3.1.4 of MIL-STD-188-100.

4.3.1.3 **Interchange and control circuits.** Under consideration.

NOTE: MIL-STD-188-114 is being updated and will include this information.

4.3.1.4 **Data signal connections.** The connection for the exchange of information between a DTE or a terminal subsystem and a transmission subsystem shall be by serial transfer of bits in a single data channel.

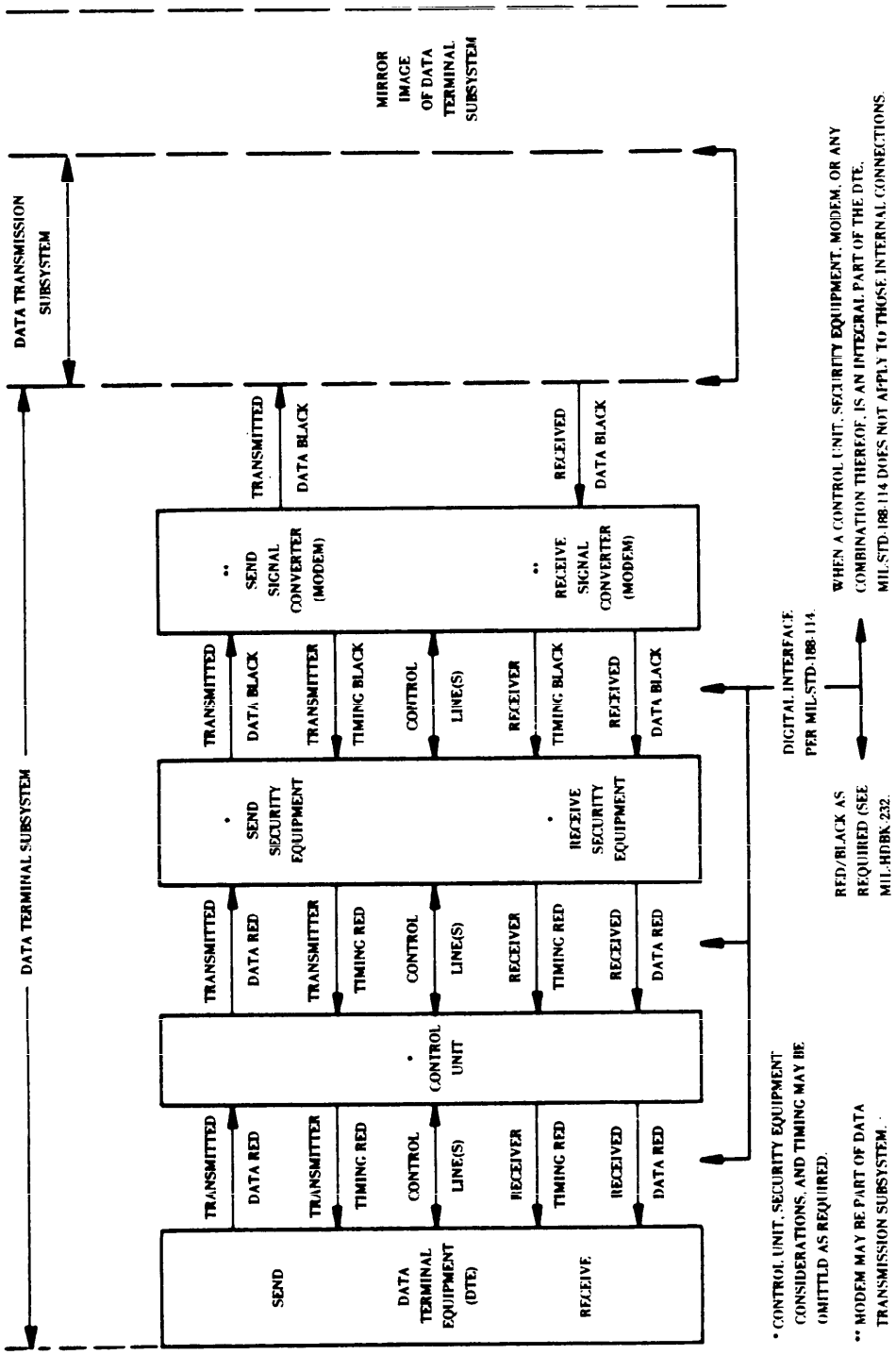
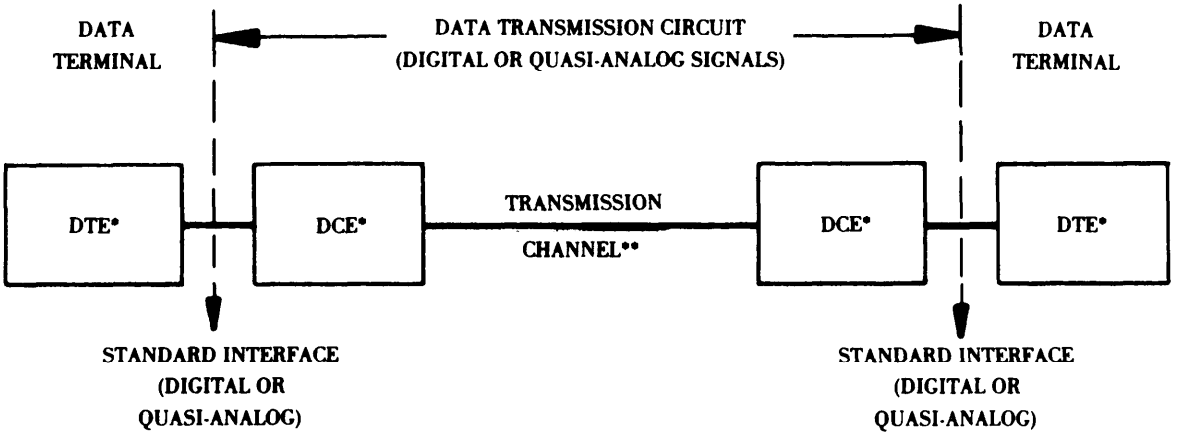
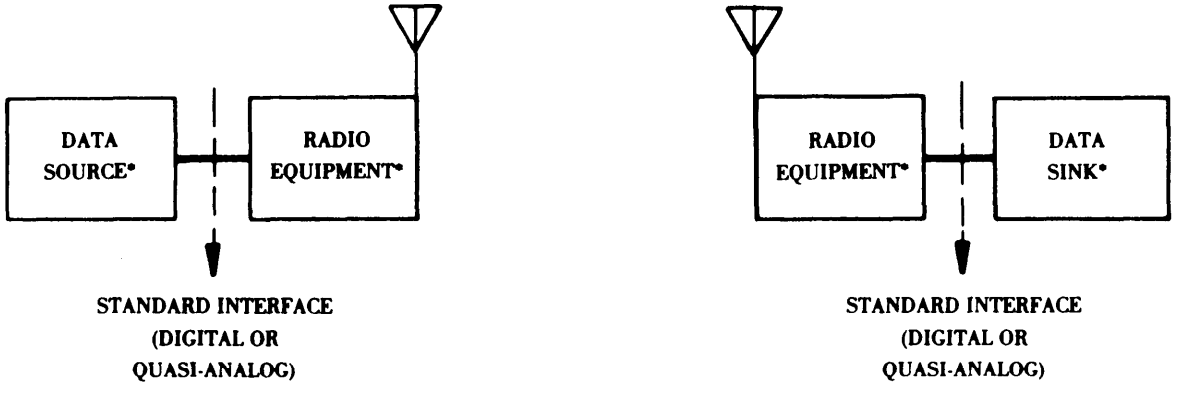


FIGURE 1. Example of a block diagram of a data terminal subsystem.



A. Block diagram of multichannel circuit.



B. Block diagram of single channel radio circuit.

* MAY INCLUDE DATA ADAPTERS, MODEMS, ERROR CONTROL DEVICES, CONTROL UNITS, AND OTHER EQUIPMENT AS REQUIRED.

** MAY INCLUDE NODES AND MULTICHANNEL TRANSMISSION FACILITIES.

FIGURE 2. Standard interface between a data terminal subsystem and a data transmission subsystem.

NOTE 1: Timing, control, and alarm functions may require additional connections between a DTE or a terminal subsystem, and a transmission subsystem.

NOTE 2: Parallel data lines may be used to connect equipment within a terminal subsystem. The information transfer in this parallel connection is parallel-by-bit, serial-by-character.

4.3.1.5 **Input/output signal characteristics.** Telegraph and data equipment sources shall deliver, and sinks shall accept, unit interval signals.

4.3.2 **Logic and signal sense for binary signals.** For information interchange between and among communications terminals and associated equipment, the logic and signal sense for binary data and timing signals shall comply with the applicable requirements stated in table I. The signal voltage with respect to signal ground shall be negative to represent the significant condition of Mark, and positive to represent the significant condition of Space. For recording binary information on magnetic tape, the magnetic flux polarity shall comply with the applicable requirements of subparagraph 5.4.1.8.3 of MIL-STD-188-200. An alternate capability shall be provided to interoperate with equipment that conforms to other standards (such as older versions of MIL-STD-188 and MIL-STD-188-100) which have polarities opposite to those polarities stated in table I.

NOTE: In MIL-STD-188-114, the significant conditions of Mark and Space for telegraphy and data transmission and for timing have been changed from Mark represented by a positive voltage (positive Mark) and Space represented by a negative voltage (negative Space) as stated in subparagraph 4.3.1.5 of MIL-STD-188-100, to negative Mark and positive Space. Existing equipment and facilities are not intended to be converted to the negative Mark/positive Space conditions unless a major facility modification or rehabilitation is planned and such conversion could be accommodated during that work. However, a provision for negative and positive Mark must be accommodated in the acquisition of new equipment. This guidance is only intended to mean that new equipment or facilities will be purchased with the positive and negative Mark capability. The facilities engineering or operating agency will be expected to make the changeover to negative Mark on a case-by-case basis, subject to operational and fiscal constraints.

TABLE I. Logic and signal sense for binary signals.

APPLICATION	CONDITION	
Voltage to signal ground	Negative (−)	Positive (+)
Conventional term	Mark	Space
Binary digit value	One (1)	Zero (0)
Timing signal state	Off	On
FSK signal state	Lower frequency	Higher frequency
Neutral system current	On	Off
Tone, single-frequency AM system	On	Off
Tone, dual-frequency AM system	Lower frequency	Higher frequency

4.3.3 **Codes for information interchange.** The code for information interchange shall be the USA Standard Code for Information Interchange (USASCII or ASCII) in accordance with the current edition of FIPS PUB 1, and subparagraph 5.3.7 of MIL-STD-188-200.

NOTE 1: FIPS PUB 1-1 has adopted ANSI X3.4-1977.

NOTE 2: The requirements of 4.3.3 are intended to mean that all character-conscious equipment for the interchange of common user information, such as teleprinters, must have the capability to use the basic ASCII character set, or one or more of the ASCII subsets. In addition to the ASCII capabilities, character-conscious data equipment may also have the capability to use any other code, such as the five-unit code of the International Telegraph Alphabet (ITA) No. 2 if required for interoperability with older equipment still in the inventory; or the capability to use any other alphabet if required for interoperability with equipment of allied forces in foreign countries.

4.3.3.1 **NATO 7-bit code.** The interchange of coded character-oriented information among information processing systems, communications systems, and associated equipment within NATO military and civil organizations shall comply with applicable requirements of the current edition of STANAG 5036.

NOTE: STANAG 5036 applies to information interchange among fixed stations, ships, vehicles, and aircraft. The NATO 7-bit code, derived from the ITA No. 5, is compatible with ASCII.

4.3.3.2 **ABCA Armies' 7-bit code.** The interchange of coded character-oriented information among information processing systems, communications systems, and associated equipment within the ABCA armies shall comply with the applicable requirements of the current edition of QSTAG 432.

NOTE: QSTAG 432 is based on STANAG 5036.

4.3.4 **Clock equipment, control, and timing.** Clock equipment, control, and timing for DTE shall comply with the applicable requirements of subparagraph 5.3.6 of MIL-STD-188-200.

4.3.5 **External clock requirement.** All digital equipment, such as a DTE, requiring stable timing or precise character interval control shall have provisions for operating from an external clock in accordance with the applicable requirements of subparagraph 5.3.6.1 of MIL-STD-188-200.

4.3.6 **Message formats for record traffic.** Data terminals which interoperate with U.S. tactical automatic message switches shall comply with the applicable operating procedures specified in the current edition of ACP 127. Tactical terminals that have an interface requirement with NATO shall comply with the current edition of ACP 127, NATO Supplement 3. Tactical terminals that have an interface requirement with AUTODIN shall comply with the current edition of JANAP 128.

4.3.7 **Signal conditioning, diphase modulation, and conditioned diphase modulation.** Signal conditioning and diphase modulation are two independent means of processing a serial binary digital signal to facilitate data transmission over wire, cable, or radio links. Data terminal subsystems employing binary digital signals with conditioning or diphase modulation, or both, shall comply with the applicable requirements of 4.3.7.1 through 4.3.7.3.

4.3.7.1 **Signal conditioning.** Conditioning of binary data signals shall be accomplished by using the following rules in accordance with part D of figure 3. The significant condition of Space (0) is transmitted by repeating the same level as in the immediately preceding unit interval (regardless of which level exists in the preceding unit interval). The significant condition of Mark (1) is transmitted by reversing the level at the beginning of the unit interval from the level in the immediately preceding unit interval (regardless of which level exists in the preceding unit interval).

NOTE: The rules used for conditioning of binary data signals are known as differential coding where bits are transmitted in terms of "changes" and "no changes" rather than amplitude levels. A conditioned signal allows correct bit recovery at the data sink regardless of any polarity reversals that may occur in associated transmission links, such as radio links.

4.3.7.2 **Diphase modulation.** Diphase modulation of binary data signals shall be accomplished by using the following rules in accordance with part E of figure 3. The significant condition of Space (0) is transmitted by a level change from negative to positive levels at the middle of the unit interval. The significant condition of Mark (1) is transmitted by a level change from positive to negative levels at the middle of the unit interval, resulting in a phase shift of 180 degrees with reference to the phase of the significant condition of Space (0).

NOTE 1: The purpose of diphase modulation is to eliminate the direct current (dc) component in the frequency spectrum of a baseband data signal and to enhance the recovery of timing from the data signal by ensuring that every unit interval has at least one signal transition (in the middle of the unit interval).

NOTE 2: The waveform shown in part E of figure 3 is also known as Manchester II data code, or double current cable code.

4.3.7.3 **Conditioned diphase modulation.** Conditioned diphase modulation of binary data signals shall be accomplished by using the following rules in accordance with part F of figure 3. The significant condition of Space (0) is transmitted by repeating the same phase as in the immediately preceding unit interval, regardless of which phase exists in the preceding unit interval. The significant condition of Mark (1) is transmitted by changing the phase 180 degrees with reference to the phase in the immediately preceding unit interval, regardless of which phase exists in the preceding unit interval.

NOTE 1: Conditioned diphase modulation may be accomplished, as shown in figure 3, by diphase modulation of a conditioned binary baseband signal in accordance with the rules given in 4.3.7.1 and 4.3.7.2.

NOTE 2: If a conditioned diphase modulated signal is demodulated by comparing the signal phases in two adjacent unit intervals, there is a one-bit error extension inherent in this demodulation process.

4.4 Requirements for analog terminal equipment.

4.4.1 **Terminal impedance.** The terminal impedance of an analog interface shall be 600 ohms, balanced to ground, with a minimum return loss of 25 decibels (dB) against a resistance of 600 ohms over the frequency band of interest. The electrical symmetry shall be sufficient to suppress longitudinal currents to a level which is at least 40 dB below reference level (−40 dBm0).

4.5 **Modems.** Modems shall comply with the applicable requirements of the current edition of MIL-STD-188-110.

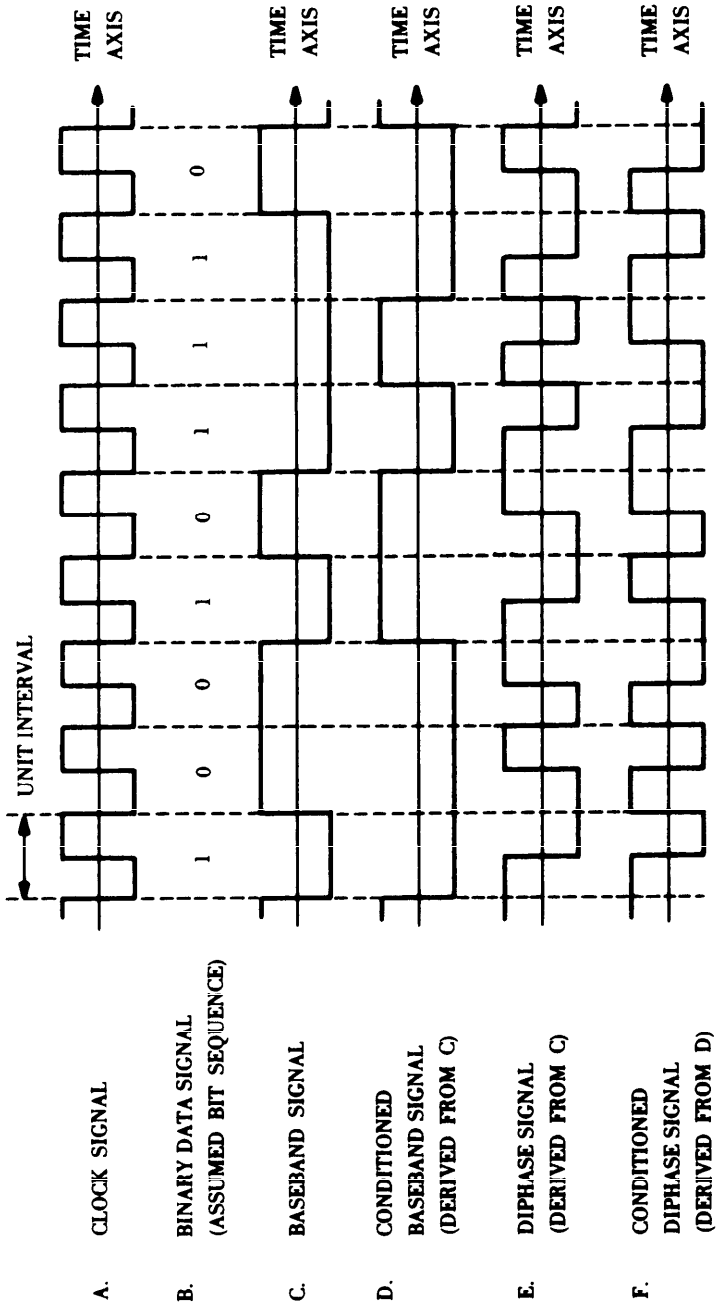


FIGURE 3. Signal conditioning, diphase and conditioned diphase modulation.

5. DETAILED REQUIREMENTS

5.1 **Digital terminal equipment.**

5.1.1 **Digital telephone.** The digital telephone is a 4-wire telephone set that transmits and receives digitized voice and loop signaling information. The digital telephone shall comply with the applicable requirements of 4.2 and 4.3 and the detailed requirements of 5.1.1.1 through 5.1.1.8.

5.1.1.1 **Loop signaling and supervision.**

5.1.1.1.1 **Signaling codewords.** All digital loop signaling sequences shall employ 8-bit cyclically permutable codewords. The bit patterns for the 8-bit codewords shall be as shown in table II. The codeword and transmission requirements for each signaling statement shall be as shown in table III. Transmission of the codewords shall be bit serial, reading from left to right.

NOTE: The digital telephone is a sequential device whose phases determine the transmission and reception of digitized voice and signaling. The digital telephone phases are: Idle (On-hook), Seize, Dial, Synchronization (Sync), Traffic, Release, and Answer.

5.1.1.1.2 **Signaling formats.** The formats employed for the transmission of digital loop-signaling information shall be in 8-bit codewords transmitted continuously until acknowledged or timed out, with the exception of the LOCKIN ACK and RELEASE ACK which shall be 8-bit codewords transmitted a minimum of 256 times and a maximum number of times not to exceed one second.

5.1.1.2 **Data signaling rates.** Data signaling rates shall be 16 kb/s or 32 kb/s.

5.1.1.3 **Analog to digital (A-D)/digital to analog (D-A).** A-D/D-A conversion shall be continuously variable slope delta (CVSD) modulation.

NOTE: MIL-STD-188-113 is being developed and will include CVSD characteristics.

5.1.1.4 **Ringer.** Digital telephones shall include a ringer which produces an audible tone when an incoming RING VOICE codeword is detected.

NOTE: Technical parameters and other details of the ringer are not standardized and will be provided by applicable equipment specifications.

5.1.1.5 **Sidetone.** Sidetone coupling within the digital telephone shall be provided. A sound pressure of 28 pascals from a source with a frequency of 1000 Hz, ±25 Hz, into the transmitter shall produce a sound pressure of 6 pascals from the receiver in conjunction with a 6 cubic centimeter (cm^3) coupler. The coupling loss should be approximately 16 dB. The coupling loss value is not critical, but should not be so low as to cause singing nor so high as to be ineffective.

5.1.1.6 **Digit sidetone.** Sidetone shall be audible in the handset receiver whenever the codeword representing a depressed keyboard button is being transmitted.

NOTE: Technical parameters and other details of the sidetone are not standardized and will be provided by applicable equipment specifications.

TABLE II. Bit patterns for digital signaling codewords.

CODEWORD	BIT PATTERN FOR CODEWORD
1	1111 1111
2*	
3	1111 1100
4	1111 1010
5	1111 0110
6	1110 1110
7-13*	
14	1111 0000
15	1110 1000
16	1110 0100
17	1110 0010
18	1100 1100
19	1101 1000
20	1101 0010
21	1101 0100
22	1100 1010
23	1010 1010
24-30*	
31	1000 1000
32	1001 0000
33	1010 0000
34	1100 0000
35*	
36	0000 0000

* Bit pattern is undefined.

5.1.1.7 **Conditioned diphase modulation.** Digital telephones shall use conditioned diphase modulation, with characteristics as stated in 4.3.7.3.

5.1.1.8 **Keyboard arrangement.** Digital telephones shall have a 16-button keyboard with the keys arranged and colored as shown in figure 4. The keys shall be: 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, FO (Flash Override), F (Flash), I (Immediate), P (Priority), C (Conference request/end of dialing), and R (Reserved for future use).

5.1.2 **Teletypewriter.** Teletypewriters may include keyboards, printers, paper tape punches/readers, and magnetic media. These components shall comply with the applicable requirements of 4.2, 4.3, 5.1.2.1, and 5.1.2.2; printer requirements of 5.1.3; paper tape punch and reader requirements of 5.1.4; and magnetic media requirements of 5.1.5. These standards apply to all teletypewriters regardless of whether the implementation is to mechanical, electromechanical, or electronic teletypewriters.

TABLE III. Digital signaling.

Function	Codeword	Phase Change*		Digital Telephone	
		From	To	Receives	Transmits
Keys (para. 5.1.1.8)					
1	14	Dial	Dial		x
2	16	Dial	Dial		x
3	3	Dial	Dial		x
4	15	Dial	Dial		x
5	34	Dial	Dial		x
6	22	Dial	Dial		x
7	6	Dial	Dial		x
8	19	Dial	Dial		x
9	32	Dial	Dial		x
0	33	Dial	Dial		x
FO	21	Dial	Dial		x
F	18	Dial	Dial		x
I	20	Dial	Dial		x
P	17	Dial	Dial		x
C	31	Traffic	Dial		x
R	5	Traffic	Traffic		x
ONES	1	**	**	x	
CUE	3	Any	Seize	x	
RELEASE	4	Any	Seize		x
SEIZE	5	Idle	Seize		x
RATE CHANGE	15	Sync/Idle	Sync	x	
RATE CHANGE ACK	17	Sync	Sync		x
FORCE CLEAR	19	Any	Release	x	
RING VOICE	20	Idle	Idle	x	
RING ACK	21	Idle	Idle		x
DIAL	21	Seize	Dial		x
RELEASE ACK	22	Release	Idle	x	
RING TRIP	22	Idle	Answer		x
IDLE (ON-HOOK)	23	***	***	x	
INTERDIGIT	23	Dial	Dial		x
GO-TO-PLAINTEXT	34	Sync/Idle	Sync	x	
LOCKIN	36	Sync	Sync		x
LOCKIN ACK	36	Sync	Traffic	x	x

* See NOTE, 5.1.1.1.1.

** ONES may be received by the digital telephone during the Synchronization and Release phases. The digital telephone is not required to detect codeword 1.

*** The digital telephone is not required to detect IDLE.

5.1.2.1 **Distortion margin.**

5.1.2.1.1 **Receiver.** Teletypewriter receivers shall detect and print characters correctly with the received signal having a maximum distortion as shown in table IV.

5.1.2.1.2 **Transmitter.** Electromechanical teletypewriter transmitters shall transmit characters whose total distortion, due to any combination of causes (including bias, fortuitous, cyclic, or characteristic), does not exceed ±3 per cent of the unit interval. Electronic teletypewriter transmitters shall transmit characters whose total distortion, due to any combination of causes (including bias, fortuitous, cyclic, or characteristic), does not exceed ±1 per cent of the unit interval.

5.1.2.2 **Keyboard arrangement.** Keyboard arrangements shall comply with the applicable requirements of the current edition of MIL-STD-1280.

5.1.3 **Printer.** Printers include character, line, and page printers. Printers shall comply with the applicable requirements of 4.2 and 4.3 and the detailed requirements of 5.1.3.1 through 5.1.3.6.

5.1.3.1 **NATO interoperability.** For interoperability among NATO member nations, printers shall be capable of complying with the applicable requirements of the current edition of STANAG 5045.

5.1.3.2 **Format.** Printers used for narrative traffic shall print at least 80 characters per line. Printers shall provide end-of-line sensing with automatic line feed and carriage return. As a design objective, printers should print 10 characters per inch (cpi) (approximately 4 characters per cm) horizontally, and 6 lines per inch (approximately 2.4 lines per cm) vertically.

5.1.3.3 **Distortion margin.** Printers shall detect and print characters correctly with the received signal having a maximum distortion as shown in table IV.

5.1.3.4 **Printing media.** Printers shall operate with rolled paper or fanfold paper, or both, in accordance with the applicable requirements of 5.1.3.4.1 and 5.1.3.4.2.

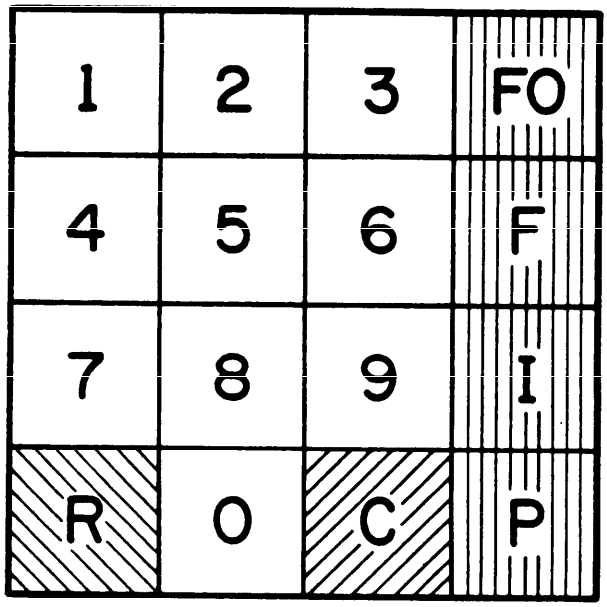
5.1.3.4.1 **Paper rolls.** Paper rolls used with friction-feed operation shall be 8.5 inches (215.9 mm) wide and the roll shall have a diameter of nominally 5 inches (127 mm) in accordance with the current edition of Federal Specifications UU-P-547.

5.1.3.4.2 **Fanfold forms.** Fanfold forms used with sprocket-feed operation shall be 8.5 inches (215.9 mm) wide in accordance with the current edition of MIL-P-40023.

5.1.3.5 **Font.** Printers shall be capable of printing optical character recognition (OCR) font B. The shape and dimensions of the characters shall comply with the applicable requirements of the current edition of FIPS PUB 32.

NOTE 1: FIPS PUB 32-1 has adopted, in whole or in part, ANSI X3.2-1970(R1976), ANSI X3.17-1981, and ANSI X3.49-1975(R1982).

NOTE 2: The use of OCR font B is to facilitate the interoperability between an optical character recognition equipment (OCRE) and a printer.



KEY COLOR LEGEND

BLACK WITH WHITE NUMERALS

RED WITH WHITE LETTERS

WHITE WITH BLACK LETTER

ORANGE WITH BLACK LETTER

FIGURE 4. Telephone keyboard diagram.

TABLE IV. Distortion margin for printers.

Parameters	Maximum distortion of input signals (in per cent)	
	Mark	Space
Electronic Printers:		
Bias distortion	49	49
Cyclic distortion	24.5	24.5
Fortuitous distortion	49	49
Electromechanical Printers:		
Bias distortion	45	45
Cyclic distortion	22.5	22.5
Fortuitous distortion	45	45

5.1.3.6 **Character positioning.** Character positioning shall comply with the applicable requirements of the current edition of FIPS PUB 89.

NOTE: FIPS PUB 89 has adopted ANSI X3.93M-1981.

5.1.3.7 **Copy density.** Print density shall comply with the applicable requirements of the current edition of FIPS PUB 90.

NOTE: FIPS PUB 90 has adopted ANSI X3.99-1983.

5.1.4 **Paper tape punch and reader.** Paper tape punches and readers shall comply with the applicable requirements of 4.2 and 4.3 and the detailed requirements of 5.1.4.1 through 5.1.4.4.

5.1.4.1 **Physical dimensions of perforated tape.** The physical dimensions, including size and location of the perforations used for recording information, shall comply with the applicable requirements of the current edition of FIPS PUB 26.

NOTE: FIPS PUB 26 has adopted ANSI X3.18-1967.

5.1.4.2 **Tape width.** Paper tape punches and readers shall operate with 1 inch (25.4 mm) wide paper tape.

NOTE: Federal Specifications UU-T-120 contains the physical dimensions of 11/16 inch (17.5 mm) and 7/8 inch (22.2 mm) wide perforated tape, which is still used with older equipment.

5.1.4.3 **Perforated tape code for information interchange.** Paper tape punches and readers shall operate with the perforated tape code in accordance with the applicable requirements of the current edition of FIPS PUB 2.

NOTE: FIPS PUB 2 has adopted ANSI X3.6-1965(R1973).

5.1.4.4 **Tape reel.** Paper tape punches and readers shall accept tape reels with a diameter up to 10.5 inches (267 mm).

5.1.5 **Magnetic tape recorder and reader.** Magnetic tape recorders and readers shall comply with the applicable requirements of 4.2 and 4.3 and the detailed requirements of 5.1.5.2 through 5.1.5.5.

5.1.5.1 **Cartridges and cassettes.** Under consideration.

5.1.5.2 **Tape width.** Magnetic tape recorders and readers shall operate with 0.5 inch (12.7 mm) wide tape.

5.1.5.3 **Recorded magnetic tape for information interchange (800 cpi NRZI).** For representing the ASCII on 9-track 0.5 inch (12.7 mm) wide magnetic tape at the recording density of nominally 800 cpi (approximately 32 cpmm) using NRZI, the recording characteristics and the data format shall comply with the applicable requirements of the current edition of FIPS PUB 3.

NOTE 1: FIPS PUB 3-1 has adopted, with one exception, ANSI X3.22-1973. The exception specified in FIPS PUB 3-1 changes the text of paragraph 5.4.3 of ANSI X3.22-1973 to read as follows: "Bit Z shall be zero or treated as a bit of higher order than the ASCII bits."

NOTE 2: The exception specified in the FIPS is interpreted to mean that bit Z will be a zero when recording the ASCII characters but may be other than zero when recording dense numeric, binary, or extended ASCII code representations.

5.1.5.4 **Recorded magnetic tape for information interchange (1600 cpi, phase encoding).** For representing the ASCII on 9-track 0.5 inch (12.7 mm) wide magnetic tape at the recording density of nominally 1600 cpi (approximately 63 cpmm) using phase encoding, the recording characteristics and the data format shall comply with the applicable requirements of FIPS PUB 25.

NOTE: FIPS PUB 25 has adopted, with one exception, ANSI X3.39-1973. The exception specified in FIPS PUB 25 changes the text of paragraph 5.4.3 of ANSI X3.39-1973 to read as follows: "Bit Z shall be zero or treated as a bit of higher order than ASCII bits." See NOTE 2 of 5.1.5.3 for an interpretation of this exception.

5.1.5.5 **Recorded magnetic tape for information interchange (6250 cpi, group-coded recording).** For representing the ASCII on 9-track 0.5 inch (12.7 mm) wide magnetic tape at the recording density of nominally 6250 cpi (approximately 246 cpmm) using NRZI with group-coded recording, the recording characteristics and data format shall comply with the applicable requirements of FIPS PUB 50.

NOTE: FIPS PUB 50 has adopted, with one exception, ANSI X3.54-1976. The exception specified in FIPS PUB 50 changes the text of paragraph 5.4.4 of ANSI X3.54-1976 to read as follows: "Bit Z shall be zero or treated as a bit of higher order than the ASCII bits." See NOTE 2 of 5.1.5.3 for an interpretation of this exception.

5.1.6 **Digital facsimile equipment.** Digital facsimile equipment shall comply with the applicable requirements of the current edition of MIL-STD-188-161.

5.1.7 **Keyboard display terminal (KDT).** KDT may be used for sending, receiving, composing, editing, displaying, storing, and monitoring message traffic. Information in the form of alphanumeric or graphic characters may be manually entered into the internal memory of the KDT from the keyboard, displayed for editing purposes, stored in an optional auxilliary storage device, and then transmitted over a data communication channel at specified modulation or data signaling rates. KDT shall comply with the applicable requirements of 4.2 and 4.3. Keyboard arrangements shall comply with the applicable requirements of the current edition of MIL-STD-1280.

5.1.8 **Card punch and reader.** Card punches and readers shall comply with the applicable requirements of 4.2 and 4.3 and the detailed requirements of 5.1.8.1 and 5.1.8.2.

5.1.8.1 **Physical dimensions of punched card.** The physical dimensions of punched cards shall comply with the applicable requirements of the current edition of Federal Specification G-C-116. The size and location of the perforations used for recording information shall comply with the applicable requirements of the current edition of FIPS PUB 13.

NOTE: FIPS PUB 13 has adopted ANSI X3.21-1967.

5.1.8.2 **Punched card code for information interchange.** Card punches and readers shall operate with the punched card code in accordance with the applicable requirements of the current edition of FIPS PUB 14.

NOTE: FIPS PUB 14-1 has adopted ANSI X3.26-1980.

5.1.9 **Optical character recognition equipment (OCRE).** OCRE shall comply with the applicable requirements of 4.2 and 4.3 and the detailed requirements of 5.1.9.1 through 5.1.9.4.

5.1.9.1 **Font.** OCRE shall be capable of operating with OCR font B. The shape and dimensions of the characters shall comply with the applicable requirements of the current edition of FIPS PUB 32.

NOTE: FIPS PUB 32-1 has adopted, in whole or in part, ANSI X3.2-1970(R1976), ANSI X3.17-1981, and ANSI X3.49-1975(R1982).

5.1.9.2 **Character positioning.** Character positioning shall comply with the applicable requirements of the current edition of FIPS PUB 89.

NOTE: FIPS PUB 89 has adopted ANSI X3.93M-1981.

5.1.9.3 **Copy density variations.** Scanners shall automatically compensate for variations in copy background and print reflection densities in accordance with the applicable requirements of the current edition of FIPS PUB 90.

NOTE: FIPS PUB 90 has adopted ANSI X3.99-1983.

5.1.9.4 **Message form.** For narrative traffic, the OCRE shall accept the current edition of DoD Joint Message Form DD 173 (OCR).

NOTE: The new standard DD 173 (OCR) is available in "drop out" blue or red colors for OCRE use.

5.2 **Analog terminal equipment.**

5.2.1 **Analog telephone.** Analog telephones may be 2-wire or 4-wire telephones and shall comply with the applicable requirements of 4.2 and 4.4, and the detailed requirements of 5.2.1.1 through 5.2.1.6.

5.2.1.1 **NATO interoperability.** For interoperability among NATO member nations, analog telephones shall comply with the applicable requirements of the current edition of STANAG 5004.

NOTE: Standards contained in this document comply with STANAG 5004.

5.2.1.2 **Loop signaling and supervision.**

5.2.1.2.1 **Ringer.** Analog telephones shall include a ringer which produces an audible tone when an incoming ringdown signal is detected.

5.2.1.2.1.1 **Impedance.** Impedance of ringers shall be not less than 6000 ohms measured at 20 Hz and 35 Vrms. The inductance of the ringer shall be not less than 15 henries (H) at 2 Vrms and 900 Hz.

5.2.1.2.1.2 **Operation.** For 2-wire telephones, ringers shall operate with a received ringdown signal level between 15 Vrms and 110 Vrms and a frequency of 20 Hz, ±5 Hz. For 4-wire telephones, ringers shall operate with a received ring point-to-point (see table VI) signal level between −2 dBm and −24 dBm and a frequency of 570 Hz, ±2 per cent.

5.2.1.2.2 **Local battery operation.** For the local battery mode of operation, the battery supplying microphone power shall be integral to the telephone set. Signaling to the other end of the loop (switchboard or other telephone) shall be achieved by a ringdown signaling generator integral to the telephone set. The ringdown signal shall comply with the parameters of 5.2.1.2.5.

5.2.1.2.3 **Common battery operation.** For the common battery mode of operation, the battery supplying microphone power shall be provided by the switchboard over the loop. Signaling to the switchboard shall be achieved by dc closure.

5.2.1.2.4 **Common battery supervision.** For the common battery supervision mode of operation, the battery supplying microphone power shall be integral to the telephone set. Signaling to the switchboard shall be achieved by dc closure.

5.2.1.2.5 **Ringdown signaling.** Ringdown signaling generators shall deliver a ringdown signal with a frequency of 20 Hz, ±5 Hz, and a level of not less than 35 Vrms into a resistive load of 1500 ohms, ±10 per cent. The open circuit voltage of the ringdown signaling generator shall not exceed 60 Vrms. Ringers shall operate with a received ringdown signal level in accordance with 5.2.1.2.1.2.

NOTE: Interoperability with older ringdown signaling equipment still in the inventory requires an upper limit of 110 Vrms of the received signal level.

5.2.1.2.6 **Dial pulse signaling.** Two categories of dial pulsing are recognized: low speed (for step-by-step systems), and high speed (for common control systems; e.g., crossbar systems). Dial pulse signaling shall comply with the applicable requirements of table V.

5.2.1.2.7 **DTMF signaling.** Dial tone multifrequency (DTMF) signaling shall comply with the applicable requirements of table VI. Tolerance of all frequencies shall be ±1.3 per cent, with the exception of RING POINT-TO-POINT which shall be ±2.0 per cent.

5.2.1.3 **Transmit direction.**

5.2.1.3.1 **Output power level.** An acoustical signal with a frequency of 1000 Hz, ±25 Hz, and a sound pressure of 28 pascals at the transducer (points B, figure 5) shall produce a level of −6 dBm, ±2 dB, into a 600 ohm load measured at the output of the telephone set (points B′, figure 5).

5.2.1.3.2 **Amplitude clipping level.** Amplitude clipping shall not occur below an output level of +3 dBm, as measured at point B′ of figure 5.

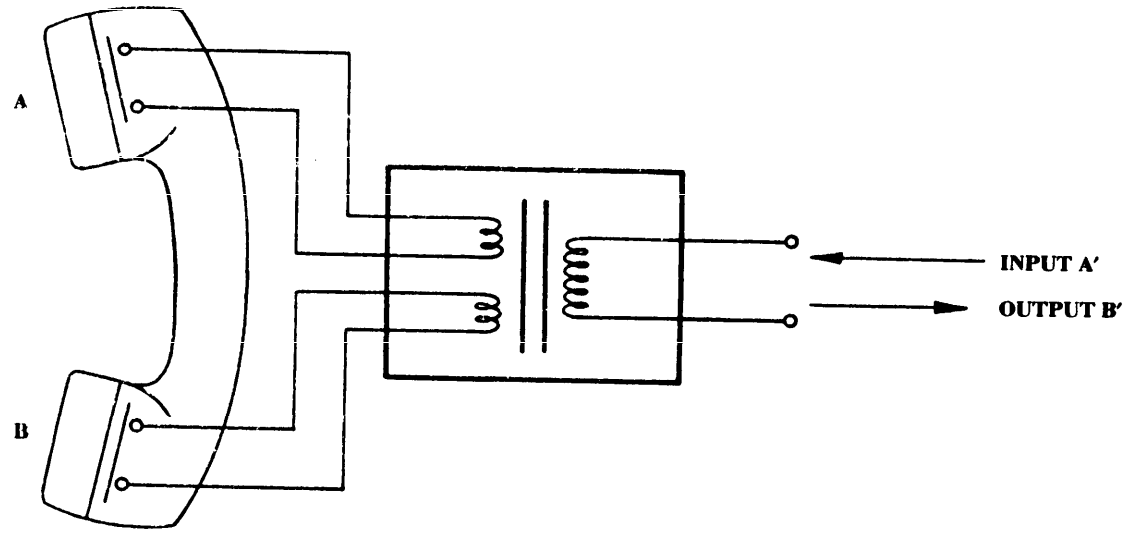
5.2.1.3.3 **Amplitude frequency response.** An acoustical signal of equal sound pressure and a frequency between 300 Hz and 3400 Hz at the transducer (points B, figure 5) shall produce an electrical signal, referenced to 1000 Hz and measured at the telephone output (points B′, figure 5), within the limits of ±4 dB between 500 Hz and 1500 Hz and within the limits of ±6 dB between 300 Hz and 500 Hz and between 1500 Hz and 3400 Hz.

5.2.1.3.4 **Total harmonic distortion.** The total harmonic distortion of an analog telephone in the transmit direction shall be less than 5 per cent, produced by an acoustical signal with a frequency between 300 Hz and 3400 Hz (at points B, figure 5) and measured as an electrical signal with a level of 0 dBm (at points B′, figure 5).

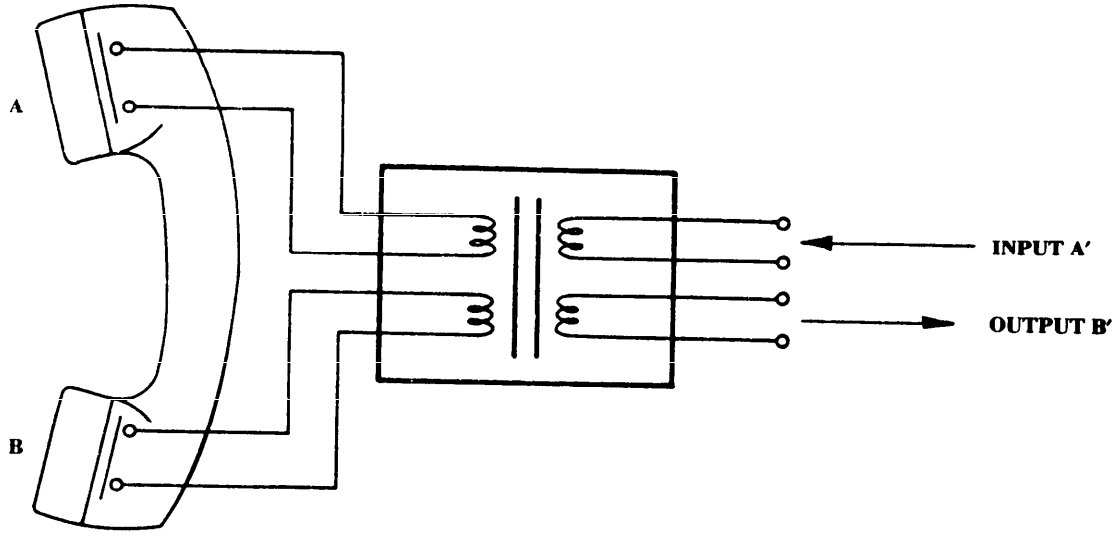
5.2.1.3.5 **Noise.** Noise outputs in the transmit direction (points B′, figure 5) shall not exceed −40 dBm with no input sound pressure.

TABLE V. Dial Pulse Signaling.

	Low Speed	High Speed
Break period: (per cent of combined make and break period)	60 to 67	60 to 67
Speed (pulses per second)	9.5 to 10.5	17 to 19
Minimum interdigital period: (milliseconds)	570 to 630	285 to 315



TWO-WIRE TELEPHONE



FOUR-WIRE TELEPHONE

FIGURE 5. Analog telephone.

TABLE VI. DTMF Signaling.

Function	Freq. (Hz)	Single Tone Level (dBm)	Duration	Remarks
Keys				
1	697/1209	−7±2	Subscriber controlled	
2	697/1336	−7±2	"	
3	697/1477	−7±2	"	
4	770/1209	−7±2	"	
5	770/1336	−7±2	"	
6	770/1477	−7±2	"	
7	852/1209	−7±2	"	
8	852/1336	−7±2	"	
9	852/1477	−7±2	"	
0	941/1336	−7±2	"	
FO	697/1633	−7±2	"	
F	770/1633	−7±2	"	
I	852/1633	−7±2	"	
P	941/1633	−7±2	"	
C	941/1477	−7±2	"	
R	941/1209	−7±2	"	
SEIZE	2250	−4±2	250 ms to 1.5 s	Cutoff by SEIZE ACK
RING TRIP TONE	2250	−4±2	250 ms to 2.0 s	Cutoff by RING TRIP TRIP
RELEASE	2600	−4±2	Continuous up to 3.0 s	
RING POINT-TO-POINT	570	−4±2	2.0 s ±1 s	

5.2.1.4 **Receive direction.**

5.2.1.4.1 **Sensitivity.** An electrical signal with a frequency of 1000 Hz, ±25 Hz, and a level of −32 dBm at the input to the telephone set (points A′, figure 5) shall produce a sound pressure of 2 pascals at the transducer, in conjunction with a 6 cm^3 coupler (points A, figure 5).

5.2.1.4.2 **Amplitude clipping level.** Amplitude clipping shall not occur below an input level of +3 dBm as measured at point A′ of figure 5.

5.2.1.4.3 **Amplitude frequency response.** An electrical signal of equal input power and a frequency between 500 Hz and 3000 Hz (at points A′, figure 5) shall produce an output sound pressure at the transducer (points A, figure 5) referenced to 1000 Hz, within the limits of ±3 dB between 500 Hz and 3000 Hz.

5.2.1.4.4 **Total harmonic distortion.** The total harmonic distortion of an analog telephone in the receive direction shall be less than 5 per cent, produced by an electrical signal with a frequency between 500 Hz and 3000 Hz and a level of 0 dBm (at points A′, figure 5) and measured by an acoustical signal (at points A, figure 5).

5.2.1.5 **Sidetone.** Sidetone coupling within the analog telephone shall be provided. A sound pressure of 28 pascals from a source with a frequency of 1000 Hz, ±25 Hz, into the transmitter, shall produce a sound pressure of 6 pascals from the receiver in conjunction with a 6 cm^3 coupler. The coupling loss should be approximately 16 dB. The coupling loss value is not critical, but should not be so low as to cause singing nor so high as to be ineffective.

5.2.1.6 **Keyboard arrangement.** Analog telephones requiring a keyboard shall have a 16-button keyboard with the keys arranged and colored as shown in figure 4. The keys shall be: 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, FO (Flash Override), F (Flash), I (Immediate), P (Priority), C (Conference), and R (Recall/line priority/conference release).

5.2.2 **Analog facsimile equipment.** Analog facsimile equipment shall comply with the applicable requirements of subparagraph 4.2.3 of MIL-STD-188-100.

CUSTODIANS:
ARMY — CR
NAVY — EC
AIR FORCE — 90

PREPARING ACTIVITY:
ARMY — SC

REVIEW ACTIVITIES:
ARMY — SC, CR, AV, MI, AD, TE
NAVY — AS, EC, SH, OM, NC
AIR FORCE — 02, 11, 13, 17, 71, 80, 90
DCA — DC
NSA — NS
JTCO — TT

OTHER INTERESTS:
JCS
DODECAC
NCS

PROJECT NO.:
TCTS — 2600

INTERNATIONAL INTERESTS:
NATO
ABCA ARMIES

APPENDIX A

MEMORANDUM FROM THE UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING, 16 AUGUST 1983: MANDATORY USE OF MILITARY TELECOMMUNICATIONS STANDARDS IN THE MIL-STD-188 SERIES.

This appendix contains information related to MIL-STD-188-260.

Appendix A is a **mandatory** part of this standard.

THE UNDER SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301

RESEARCH AND
ENGINEERING

16 AUG 1983

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS, LOGISTICS & FINANCIAL MANAGEMENT)
ASSISTANT SECRETARY OF THE NAVY (SHIPBUILDING & LOGISTICS)
ASSISTANT SECRETARY OF THE AIR FORCE (RESEARCH DEVELOPMENT & LOGISTICS)
COMMANDANT OF THE MARINE CORPS
DIRECTOR, DEFENSE COMMUNICATIONS AGENCY
DIRECTOR, NATIONAL SECURITY AGENCY

SUBJECT: Mandatory Use of Military Telecommunications Standards in the MIL-STD-188 Series

On May 10, 1977, Dr. Gerald Dinneen, then Assistant Secretary of Defense(C^3I), issued the following policy statement regarding the mandatory nature of the MIL-STD-188 series telecommunications standards:

"...standards as a general rule are now cited as 'approved for use' rather than 'mandatory for use' in the Department of Defense.

This deference to the judgment of the designing and procuring agencies is clearly appropriate to standards dealing with process, component ruggedness and reliability, paint finishes, and the like. It is clearly not appropriate to standards such as those in the MIL-STD-188 series which address telecommunication design parameters. These influence the functional integrity of telecommunication systems and their ability to efficiently interoperate with other functionally similar Government and commercial systems. Therefore, relevant military standards in the 188 series will continue to be mandatory for use within the Department of Defense.

To minimize the probability of misapplication of these standards, it is incumbent upon the developers of the MIL-STD-188 series to insure that each standard is not only essential but of uniformly high quality, clear and concise as to application, and wherever possible compatible with existing or proposed national, international and Federal telecommunication standards. It is also incumbent upon the users of these standards to cite in their procurement specifications only those standards which are clearly necessary to the proper functioning of the device or systems over its projected lifetime."

This statement has been reviewed by this office and continues to be the policy of the Department of Defense.

APPENDIX B

ABBREVIATIONS AND ACRONYMS

This appendix contains information related to MIL-STD-188-260.

Appendix B is a nonmandatory part of MIL-STD-188-260.

APPENDIX B. ABBREVIATIONS AND ACRONYMS

C	conference
cpmm	characters per millimeter
DCA	Defense Communications Agency
DCAC	Defense Communications Agency Circulars
DoDD	Department of Defense Directive(s)
F	Flash
FED-STD	Federal Standard
FIPS	Federal Information Processing Standard(s)
FIPS PUB	Federal Information Processing Standards Publication(s)
FO	Flash Override
H	henry(ies)
I	Immediate
ITA	International Telegraph Alphabet
JANAP	Joint Army-Navy-Air Force Publication(s)
kBd	kilobaud(s)
kb/s	kilobit(s) per second
KDT	keyboard display terminal
M-ary	Multi-level code
MIL-HDBK	Military Handbook
MIL-STD	Military Standard
mm	millimeter(s)
ms	millisecond(s)
NACSIM	National Communications Security/Emanation Security Information Memoranda
NATO	North Atlantic Treaty Organization
NMCS	National Military Command System
OCRE	optical character recognition equipment
P	Priority
QSTAG	Quadripartite Standardization Agreement
STANAG	NATO Standardization Agreement
TEMPEST	compromising emanations
Vrms	Volt(s) (root-mean-square)

INDEX

Key words are listed with reference to page numbers.

INDEX (Continued)

INDEX (Continued)

INDEX (Continued)

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1. DOCUMENT NUMBER	2. DOCUMENT TITLE
MIL-STD-188-260	Design and Engineering Standards for Tactical Terminal Subsystems

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR ☐ USER ☐ MANUFACTURER ☐ OTHER *(Specify)*: _____
b. ADDRESS *(Street, City, State, ZIP Code)*	

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

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