

Adopted as a Federal  
Information Processing  
Standard



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ANSI X3.6-1965 (R1973)

# USA Standard

## Perforated Tape Code for Information Interchange

### AMERICAN NATIONAL STANDARD

This standard is one of a number approved as either a USA Standard or an American Standard. It became an American National Standard in October 1969, when the Institute changed its name to American National Standards Institute, Inc.

ANSI 1430 Broadway, New York, N.Y. 10018

ANSI X3.6-1965 (R1973)

This USA Standard was approved as a Federal Information Processing Standard by the President of the United States, Lyndon B. Johnson, on March 11, 1968.

Details concerning its applicability and use are printed in a National Bureau of Standards series of publications called *Federal Information Processing Standards Publications*. For a complete list of the publications in this series write to the Office of Technical Information and Publications, National Bureau of Standards, Washington, D.C. 20234.

**USAS**  
**X3.6-1965**  
(Reaffirmed 1973)

**USA Standard Perforated Tape Code  
for Information Interchange**

Sponsor

**Business Equipment Manufacturers Association**

Approved July 9, 1965

## USA Standard

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*Published by*

United States of America Standards Institute

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Printed in USA  
A3C680/350

# Foreword

(This Foreword is not a part of the USA Standard Perforated Tape Code for Information Interchange, X3.6-1965.)

This publication represents the standard method of recording the USA Standard Code for Information Interchange, X3.4-1963<sup>1</sup> in perforated tape. It is one of a series of standards relating to information interchange among information processing systems, communication systems and associated equipment.

Other standards will specify the physical, chemical and optical characteristics of the tape. Related standards will deal with machine tool and process control.

The arrangement of the 7 bits in hole tracks was developed by a group of highly qualified and experienced specialists in the use of perforated tape in information processing and communication.

Historical work in the field was considered in the development of this standard.

This standard was approved as American Standard by the American Standards Association on July 9, 1965.<sup>2</sup>

Suggestions for improvement gained in the use of this standard will be welcome. They should be sent to the USA Standards Institute.

The ASA Sectional Committee on Computers and Information Processing, X3, which developed this standard, had the following personnel at the time of approval:

C. A. Phillips, *Chairman*

V. E. Henriques, *Secretary*

<i>Organization Represented</i>	<i>Name of Representative</i>
ASA Sectional Committee on Office Machines, X4 .....	C. E. Ginder
Administrative Management Society .....	F. Gardner
Air Transport Association of America .....	F. C. White
American Bankers Association .....	G. W. Frey
American Gas Association and Edison Electric Institute ( <i>Jointly</i> ) .....	J. A. Comerford
American Petroleum Institute .....	F. A. Gitzendanner
Association of American Railroads .....	C. Byham
Association for Computing Machinery .....	S. Gorn
Business Equipment Manufacturers Association .....	R. W. Bemer
	W. H. Burkhart
	H. N. Cantrell
	R. F. Clippinger
	G. T. Croft
	C. T. Deere
	R. W. Green
	J. A. Haddad
	R. J. Mindlin
	B. W. Pollard
	G. E. Poorte
	M. Sanders
Council of State Governments .....	D. G. Price
Data Processing Management Association .....	W. Claghorn
Electronic Industries Association .....	H. L. Tholstrup
Engineers Joint Council .....	W. M. Carlson
General Services Administration .....	L. Wolff
The Institute of Electrical and Electronics Engineers .....	R. W. Ferguson
	G. W. Patterson
	C. Orkild
Insurance Accounting and Statistical Association .....	L. W. Calkins
Joint Users Group .....	E. Boulanger
Life Office Management Association .....	S. N. Alexander
National Bureau of Standards .....	M. Sluis
National Machine Tool Builders Association .....	E. Langtry
National Retail Merchants Association .....	E. Tomeski
Systems and Procedures Association .....	L. W. Claussen
Telephone Group .....	G. L. Bowlby
U. S. Department of Defense .....	

<sup>1</sup>A revised USA Standard Code for Information Interchange was approved in 1967.

<sup>2</sup>The American Standards Association was reconstituted as the United States of America Standards Institute in August 1966, and American Standards are now designated USA Standards.

The personnel of the X3.2 Subcommittee on Character Sets and Data Format, which developed and processed this standard, was as follows:

L. L. Griffin, <i>Chairman</i>	J. L. Little
O. R. Arne	C. E. Mackenzie
J. F. Auwaerter	C. E. Macon
E. A. Avakian	M. Mendelsohn
T. R. Bousquet	G. L. Murphy
R. M. Brown	J. K. Nelson
E. H. Clamons	H. Spielman
M. R. Dilling	J. E. Taunt
R. M. Gryb	H. Tholstrup
A. H. Hassan	R. E. Utman
R. M. Ireland	E. F. Vidro
W. Y. Lang	A. Whitman
E. J. Lewis	J. Windhorst

The Task Group X3.2.2 on Perforated Tape, which developed the proposal, had the following personnel:

J. F. Auwaerter, <i>Chairman</i>	J. R. Lakin
M. R. Dilling	W. Y. Lang
H. Epstein	B. V. Magee
W. Flieg	W. J. Osterman
R. H. Hunter	C. E. Schultheiss
R. M. Ireland	F. W. Smith
W. J. Kosinski	F. G. Von Kummer

# USA Standard Perforated Tape Code for Information Interchange

## 1. Scope

This standard specifies the representation of the USA Standard Code for Information Interchange, X3.4-1963,<sup>1</sup> in perforated tape and similarly encoded media, used for interchange of information among equipments such as office machines, and information processing and communications apparatus.

## 2. Arrangement

The perforations shall be arranged in eight longitudinal tracks, one for each of the seven information levels and one for parity. The bits

of the USA Standard Code shall be assigned to hole tracks as shown in Fig. 1. The character represented by each 8 bit pattern is the character given in the corresponding column and row of the USA Standard Code for Information Interchange, X3.4-1963.<sup>1</sup>

## 3. Parity

A parity bit for each character (vertical parity) shall be part of the perforated tape code. The parity bit shall be recorded in the number 8 track and shall be chosen to provide an even number of code holes for each character.

<sup>1</sup>A revised USA Standard Code for Information Interchange was approved in 1967.

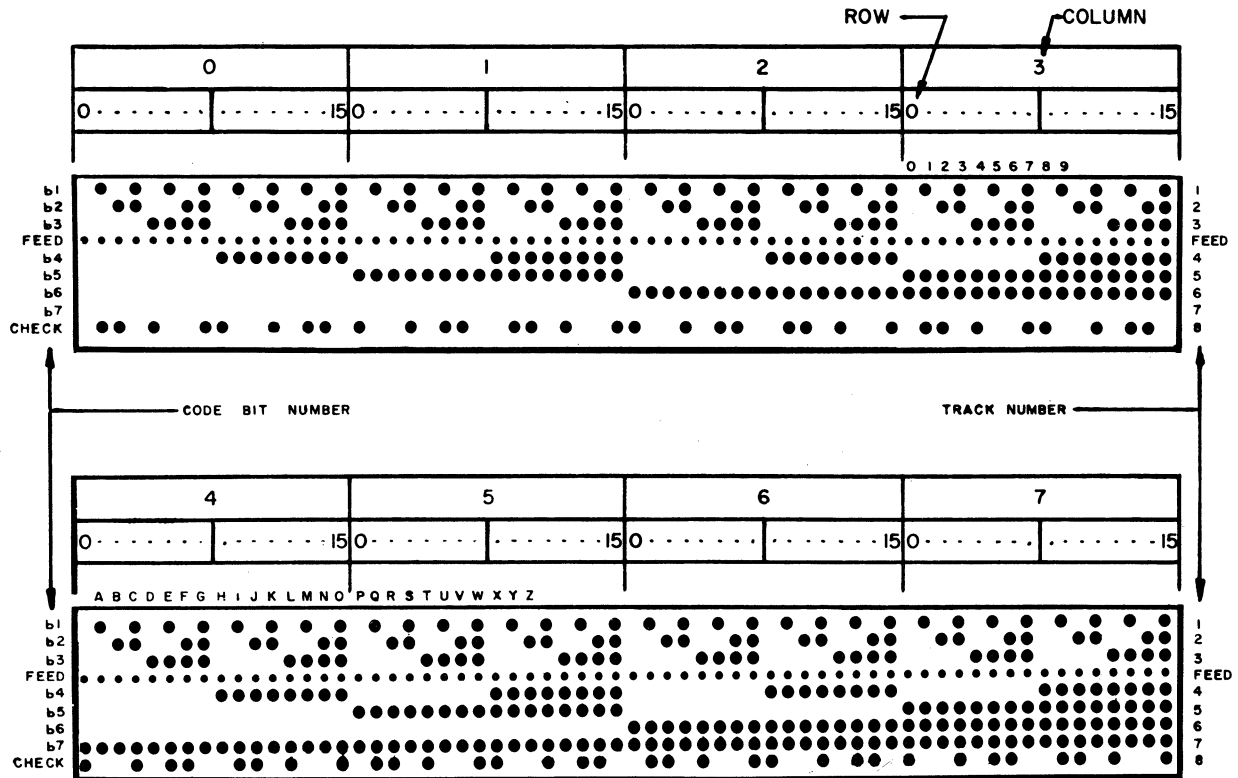


Fig. 1  
Perforated Tape Code

NOTE: For character assignments by column and row see USA Standard Code for Information Interchange, X3.4-1963 (see Section 5). The numerical and capital alphabetical characters of the Code are illustrated above for ease of reference.

## **4. Qualifications**

**4.1** Deviations from the standard may create serious difficulties in information interchange and should be used only with full cognizance of the parties involved.

**4.2** The Appendixes to this standard cover the scope and use of the perforated tape code and specific criteria.

## **5. Revision of USA Standard Referred to in This Document**

When the following USA Standard referred to in this document is superseded by a revision approved by the United States of America Standards Institute, the revision shall apply:

USA Standard Code for Information Interchange, X3.4-1963<sup>1</sup>

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<sup>1</sup>A revised USA Standard Code for Information Interchange was approved in 1967.



# Appendixes

(These Appendixes are not a part of USA Standard Perforated Tape Code for Information Interchange, X3.6-1965, but are included to facilitate its use.)

## Appendix A Scope and Use of the Perforated Tape Code

**A1.1** The Standard Perforated Tape Code is intended for interchange of information among office machines, information processing and communication systems, and associated equipment.

**A1.2** This standard does not specify the physical characteristics of the medium in which the code is perforated. Its scope is limited to media such as tape and edge-punched documents perforated by a pattern of holes lying on the intersection of longitudinal and perpendicular transverse center lines spaced approximately

one-tenth of an inch apart. It is normally expected that these media include a sprocket or feed hole track.

**A1.3** Work will continue in the following areas (not necessarily listed in order of priority): (1) physical characteristics of the media, (2) tape handling conventions (interchangeable reels, marking and direction of wind, leaders and trailers, etc). (3) marking of tapes (e.g., edge notching) for local control or other purposes.

## Appendix B Specific Criteria

### B1. Introduction

**B1.1** The criteria on which the design of the code was based have not all been entirely satisfied. Some are conflicting, and the choice of code represents an acceptable compromise of those divergent criteria.

### B2. Criteria

**B2.1** The criteria on which the code is based are summarized below, not necessarily in order of importance:

- (1) The information bits should be grouped in 7 contiguous tracks to simplify operator interpretation of unprinted tapes.
- (2) The information bits should be arranged in (ascending or descending) numerical

order across the tape to simplify operator interpretation of unprinted tapes.

- (3) A single (vertical) parity bit per character offers good protection against characteristic machine errors, and the standard should provide for such redundancy.
- (4) The parity bit should be so placed as to be immutable in contraction or expansion to other code levels.
- (5) The track number of the tape and the bit number of the logical code should be the same in order to minimize maintenance man and operator confusion.
- (6) Any 4-bit subset (consisting of the 4 low order code bits) should be recordable in the low number tracks of the tape. It is desirable that this be done in a manner which can be consistent between 11/16-inch and 1-inch tape.

# American National Standards for Information Processing

- X3.1-1976** Synchronous Signaling Rates for Data Transmission
- X3.2-1970 (R1976)** Print Specifications for Magnetic Ink Character Recognition
- X3.3-1970 (R1976)** Bank Check Specifications for Magnetic Ink Character Recognition
- X3.4-1977** Code for Information Interchange
- X3.5-1970** Flowchart Symbols and Their Usage in Information Processing
- X3.6-1965 (R1973)** Perforated Tape Code for Information Interchange
- X3.9-1978** FORTRAN
- X3.11-1969** Specification for General Purpose Paper Cards for Information Processing
- X3.14-1973** Recorded Magnetic Tape for Information Interchange (200 CPI, NRZI)
- X3.15-1976** Bit Sequencing of the American National Standard Code for Information Interchange in Serial-by-Bit Data Transmission
- X3.16-1976** Character Structure and Character Parity Sense for Serial-by-Bit Data Communication in the American National Standard Code for Information Interchange
- X3.17-1977** Character Set and Print Quality for Optical Character Recognition (OCR-A)
- X3.18-1974** One-Inch Perforated Paper Tape for Information Interchange
- X3.19-1974** Eleven-Sixteenths-Inch Perforated Paper Tape for Information Interchange
- X3.20-1967 (R1974)** Take-Up Reels for One-Inch Perforated Tape for Information Interchange
- X3.21-1967** Rectangular Holes in Twelve-Row Punched Cards
- X3.22-1973** Recorded Magnetic Tape for Information Interchange (800 CPI, NRZI)
- X3.23-1974** Programming Language COBOL
- X3.24-1968** Signal Quality at Interface between Data Processing Terminal Equipment and Synchronous Data Communication Equipment for Serial Data Transmission
- X3.25-1976** Character Structure and Character Parity Sense for Parallel-by-Bit Data Communication in the American National Standard Code for Information Interchange
- X3.26-1970** Hollerith Punched Card Code
- X3.27-1978** Magnetic Tape Labels and File Structure for Information Interchange
- X3.28-1976** Procedures for the Use of the Communication Control Characters of American National Standard Code for Information Interchange in Specified Data Communication Links
- X3.29-1971** Specifications for Properties of Unpunched Oiled Paper Perforator Tape
- X3.30-1971** Representation for Calendar Date and Ordinal Date for Information Interchange
- X3.31-1973** Structure for the Identification of the Counties of the United States for Information Interchange
- X3.32-1973** Graphic Representation of the Control Characters of American National Standard Code for Information Interchange
- X3.34-1972** Interchange Rolls of Perforated Tape for Information Interchange
- X3.36-1975** Synchronous High-Speed Data Signaling Rates between Data Terminal Equipment and Data Communication Equipment
- X3.37-1977** Programming Language APT
- X3.38-1972 (R1977)** Identification of States of the United States (Including the District of Columbia) for Information Interchange
- X3.39-1973** Recorded Magnetic Tape for Information Interchange (1600 CPI, PE)
- X3.40-1976** Unrecorded Magnetic Tape for Information Interchange (9-Track 200 and 800 CPI, NRZI, and 1600 CPI, PE)
- X3.41-1974** Code Extension Techniques for Use with the 7-Bit Coded Character Set of American National Standard Code for Information Interchange
- X3.42-1975** Representation of Numeric Values in Character Strings for Information Interchange
- X3.43-1977** Representations of Local Time of the Day for Information Interchange
- X3.44-1974** Determination of the Performance of Data Communication Systems
- X3.45-1974** Character Set for Handprinting
- X3.46-1974** Unrecorded Magnetic Six-Disk Pack (General, Physical, and Magnetic Characteristics)
- X3.47-1977** Structure for the Identification of Named Populated Places and Related Entities of the States of the United States for Information Interchange
- X3.48-1977** Magnetic Tape Cassettes for Information Interchange (3.810-mm [0.150-in.] Tape at 32 bpm [800 bpi], PE)
- X3.49-1975** Character Set for Optical Character Recognition (OCR-B)
- X3.50-1976** Representations for U.S. Customary, SI, and Other Units to Be Used in Systems with Limited Character Sets
- X3.51-1975** Representations of Universal Time, Local Time Differentials, and United States Time Zone References for Information Interchange
- X3.52-1976** Unrecorded Single-Disk Cartridge (Front Loading, 2200 BPI), General, Physical, and Magnetic Requirements
- X3.53-1976** Programming Language PL/I
- X3.54-1976** Recorded Magnetic Tape for Information Interchange (6250 CPI, Group Coded Recording)
- X3.55-1977** Unrecorded Magnetic Tape Cartridge for Information Interchange, 0.250 Inch (6.30 mm), 1600 bpi (63 bpm), Phase Encoded
- X3.56-1977** Recorded Magnetic Tape Cartridge for Information Interchange 4 Track, 0.250 Inch (6.30 mm), 1600 bpi (63 bpm), Phase Encoded
- X3.57-1977** Structure for Formatting Message Headings for Information Interchange Using the American National Standard Code for Information Interchange for Data Communication Systems Control
- X3.58-1977** Unrecorded Eleven-Disk Pack General, Physical, and Magnetic Requirements
- X3.60-1978** Programming Language Minimal BASIC
- X3.61-1978** Representation of Geographic Point Locations for Information Interchange
- X3.62-1979** Paper Used in Optical Character Recognition (OCR) Systems
- X3.64-1979** Additional Controls for Use with American National Standard Code for Information Interchange
- X3.66-1979** Advanced Data Communication Control Procedures (ADCCP)
- X3.73-1980** Single-Sided Unformatted Flexible Disk Cartridge (for 6631-BPR Use)
- X3.77-1980** Representation of Pocket Select Characters in Information Interchange
- 
- X3/TRI-77** Dictionary for Information Processing (Technical Report)

American National Standards Institute, Inc  
1430 Broadway  
New York, N.Y. 10018