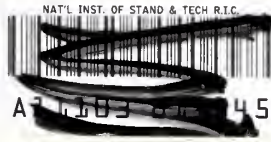


U.S. DEPARTMENT OF COMMERCE
Technology Administration
National Institute of Standards and Technology



FIPS PUB 166

FEDERAL INFORMATION PROCESSING STANDARDS PUBLICATION
(Supersedes FIPS PUB 134-1/Former Federal Standard 1006A)

4,800 AND 9,600 BITS PER SECOND TWO-WIRE DUPLEX MODEMS FOR DATA COMMUNICATIONS USE ON TELEPHONE-TYPE CIRCUITS

REFERENCE

NIST
PUBLICATIONS

CATEGORY: TELECOMMUNICATIONS STANDARD

SUBCATEGORY: MODEMS

1992 APRIL 2

FIPS PUB 166

JK
468
.A8A3
NO.166
1992

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FIPS PUB 162 - 1,200 Bits Per Second Two-Wire Duplex Modems for Data Communications Use on Telephone-Type Circuits, 1992 April 2 replaces FIPS PUB 136.

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FIPS PUB 166 - 4,800 and 9,600 Bits Per Second Two-Wire Duplex Modems for Data Communications Use on Telephone-Type Circuits, 1992 April 2 replaces FIPS PUB 134-1.

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4,800 AND 9,600 BITS PER SECOND TWO-WIRE DUPLEX MODEMS FOR DATA COMMUNICATIONS USE ON TELEPHONE-TYPE CIRCUITS

CATEGORY: TELECOMMUNICATIONS STANDARD

SUBCATEGORY: MODEMS

Computer Systems Laboratory
National Institute of Standards and Technology
Gaithersburg, MD 20899

Office of Technology and Standards
National Communications System
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Issued April 2, 1992



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Foreword

The Federal Information Processing Standards Publication Series of the National Institute of Standards and Technology (NIST) is the official publication relating to standards and guidelines adopted and promulgated under the provisions of Section 111(d) of the Federal Property and Administrative Services Act of 1949 as amended by the Computer Security Act of 1987, Public Law 100-235. These mandates have given the Secretary of Commerce and NIST important responsibilities for improving the utilization and management of computer and related telecommunications systems in the Federal Government. The NIST through its Computer Systems Laboratory provides leadership, technical guidance, and coordination of Government efforts in the development of standards and guidelines in these areas.

Comments concerning Federal Information Processing Standards Publications are welcomed and should be addressed to the Director, Computer Systems Laboratory, National Institute of Standards and Technology, Gaithersburg, MD 20899.

James H. Burrows, Director
Computer Systems
Laboratory

Abstract

Modems are used to modulate digital data into a form that can be transmitted within the voice-band frequencies passed by telephone-type circuits, and to demodulate the information back to digital data at a destination.

The modem described by this standard is based upon International Telegraph and Telephone Consultative Committee (CCITT) Recommendation V.32. This standard and FIPS PUB 165 supersede FIPS PUB 134-1 (former Federal Standard 1006A) in its entirety.

Key words: analog transmission channels; coding; communications equipment; Federal Information Processing Standard; modulation; telecommunications.

National Institute of Standards
and Technology
FIPS PUB 166
4 pages (Apr. 2, 1992)
CODEN: FIPPAT

U.S. Government Printing Office
Washington: 1992

For sale by the National
Technical Information
Service
U.S. Department of Commerce
Springfield, VA 22161

**Federal Information
Processing Standards Publication 166**

1992 April 2

Announcing the Standard for

**4,800 AND 9,600 BITS PER SECOND TWO-WIRE DUPLEX MODEMS
FOR DATA COMMUNICATIONS USE ON TELEPHONE-TYPE CIRCUITS**

Federal Information Processing Standards Publications (FIPS PUBS) are issued by the National Institute of Standards and Technology (NIST) after approval by the Secretary of Commerce pursuant to Section 111(d) of the Federal Property and Administrative Services Act of 1949 as amended by the Computer Security Act of 1987, Public Law 100-235.

1. Name of Standard. 4,800 and 9,600 Bits Per Second Two-Wire Duplex Modems for Data Communications Use on Telephone-Type Circuits (FIPS PUB 166).

2. Category. Telecommunications Standard, Modems.

3. Explanation. Modems are used to modulate digital data into a form that can be transmitted within the voice-band frequencies passed by telephone-type circuits, and to demodulate the information back to digital data at a destination.

The modem described by this standard is based upon International Telegraph and Telephone Consultative Committee (CCITT) Recommendation V.32. This standard and FIPS PUB 165 supersede FIPS PUB 134-1 (former Federal Standard 1006A) in its entirety.

4. Approving Authority. Secretary of Commerce.

5. Maintenance Agency. National Communications System, Office of Technology and Standards.

6. Related Documents. Federal Information Resources Management Regulations subpart 201-20.303, Standards, and subpart 201-39.1002, Federal Standards.

7. Objectives. This standard is intended to facilitate interoperability between telecommunication facilities and systems of the Federal Government.

8. Applicability. This standard shall be used by all Federal departments and agencies when procuring new equipment and services that utilize 4,800 and/or 9,600 bit/s two-wire duplex modems for data communications use on telephone-type circuits. However, it is not mandatory for use when expanding or replacing equipment in already existing networks of modems.

9. Specifications. The specifications are CCITT Recommendation V.32, A Family of 2-Wire, Duplex Modems Operating at Data Signalling Rates of Up to 9600 bit/s for Use on the General Switched Telephone Network and on Leased Telephone-Type Circuits.

Requirements are as follows:

- a. Section 2 of CCITT Recommendation V.32 is adopted with the following exceptions:
 - 1) Use of trellis coding at 9,600 is encouraged.
- b. Use of Section 3 of CCITT Recommendation V.32 is optional.
- c. Section 4 of CCITT Recommendation V.32 is adopted.
- d. Section 5 of CCITT Recommendation V.32 is adopted with the following exception:
 - 1) Use of the described digital interchange circuits is optional.

- e. Section 6 of CCITT Recommendation V.32 is optional.
- f. Use of Section 7 of CCITT Recommendation V.32 is adopted with the following exceptions:
 - 1) Modes 1 and 3 (synchronous) are optional.
 - 2) Character lengths of 8, 9, and 11 bits need not be supported.
- g. Use of Appendix I, Interworking procedure for echo cancelling modems (e.g., V.26 ter), is not required.

9.1 Source of Documents. Copies of CCITT Series V Recommendations, Data Communication Over the Telephone Network, are available from the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161. When ordering, specify PB89-144208.

10. Qualifications. This standard is based upon CCITT Recommendations V.32, that has undergone extensive international review and has been widely implemented by manufacturers. However, this standard will be reviewed at 5-year intervals to ensure that the needs of Government users are adequately addressed.

11. Patents. Modems implementing this standard may be covered by U.S. and foreign patents.

12. Implementation. The use of this standard by Federal departments and agencies is compulsory and binding for the acquisition of new equipment and services, effective September 15, 1992, except as noted in Section 8.

13. Waivers. Under certain exceptional circumstances, the heads of Federal departments and agencies may approve waivers to Federal Information Processing Standards (FIPS). The head of such an agency may redelegate such authority only to a senior official designated pursuant to Section 3506 (b) of Title 44, U.S. Code. Waivers shall be granted only when:

- a. Compliance with a standard would adversely affect the accomplishment of the mission of an operator of a Federal computer system or related telecommunications system, or
- b. Cause a major adverse financial impact on the operator which is not offset by Governmentwide savings.

Agency heads may act upon a written waiver request containing the information detailed above. Agency heads may also act without a written waiver request when they determine that conditions for meeting the standard cannot be met. Agency heads may approve waivers only by a written decision which explains the basis on which the agency head made the required finding(s). A copy of each such decision, with procurement sensitive or classified portions clearly identified, shall be sent to: National Institute of Standards and Technology; Attn: FIPS Waiver Decisions, Technology Building, Room B154, Gaithersburg, MD 20899.

In addition, notice of each waiver granted and each delegation of authority to approve waivers shall be sent promptly to the Committee on Government Operations of the House of Representatives and the Committee on Governmental Affairs of the Senate and shall be published promptly in the *Federal Register*.

When the determination on a waiver applies to the procurement of equipment and/or services, a notice of the waiver determination must be published in the *Commerce Business Daily* as a part of the notice of solicitation for offers of an acquisition or, if the waiver determination is made after the notice is published, by amendment to such notice.

A copy of the waiver, any supporting documents, the document approving the waiver and any supporting and accompanying documents, with such deletions as the agency is authorized and decides to make under 5 U.S.C. Sec. 552 (b), shall be part of the procurement documentation and retained by the agency.

14. Where to Obtain Copies. Copies of this publication are for sale by the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161. When ordering, refer to Federal Information Processing Standards Publication 166 (FIPSPUB166), and the title. When microfiche is desired, this should be specified. Payment may be made by check, money order, purchase order, credit card, or deposit account.



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