INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

V.32

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

(03/93)

DATA COMMUNICATION OVER
THE TELEPHONE NETWORK

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

ITU-T Recommendation V.32

(Previously "CCITT Recommendation")

FOREWORD

The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the International Telecommunication Union. The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, established the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

ITU-T Recommendation V.32 was revised by the ITU-T Study Group XVII (1988-1993) and was approved by the WTSC (Helsinki, March 1-12, 1993).

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NOTES

1   As a consequence of a reform process within the International Telecommunication Union (ITU), the CCITT ceased to exist as of 28 February 1993. In its place, the ITU Telecommunication Standardization Sector (ITU-T) was created as of 1 March 1993. Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.

In order not to delay publication of this Recommendation, no change has been made in the text to references containing the acronyms "CCITT, CCIR or IFRB" or their associated entities such as Plenary Assembly, Secretariat, etc. Future editions of this Recommendation will contain the proper terminology related to the new ITU structure.

2   In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.
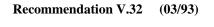
CONTENTS

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

(Malaga-Torremolinos, 1984, amended Melbourne, 1988 and Helsinki, 1993)

1   Introduction

This family of modems is intended for use on connections on general switched telephone networks (GSTNs) (see Note 1) and on point-to-point leased telephone-type circuits. The principal characteristics of the modems are as follows:

a)   Duplex mode of operation on GSTN and 2-wire point-to-point leased circuits (see Note 2).

b)   Channel separation by echo cancellation techniques.

c)   Quadrature amplitude modulation for each channel with synchronous line transmission at 2400 bauds.

d)   Any combination of the following data signalling rates may be implemented in the modems:

9600 bit/s synchronous (optional),

4800 bit/s synchronous (mandatory),

2400 bit/s synchronous (for further study).

e)   At 9600 bit/s, two alternative modulation schemes, one using 16 carrier states and one using trellis coding with 32 carrier states, are provided for in this Recommendation. However, modems providing the 9600 bit/s data signalling rate shall be capable of interworking using the 16-state alternative.

f)   Exchange of rate sequences during start-up to establish the data rate, coding and any other special facilities.

g)   Optional provision of an asynchronous mode of operation in accordance with Recommendations V.14 or V.42.

NOTES

1   On international GSTN connections that utilize circuits that are in accord with Recommendation G.235 (16-channel terminal equipments), it may be necessary to employ a greater degree of equalization within the modem than would be required for use on most national GSTN connections.

2   The transmit and receive rates in each modem shall be the same. The possibility of asymmetric working remains for further study.

2   Line signals

2.1   Carrier frequency

The carrier frequency is to be 1800 ± 1 Hz. No separate pilot tones are to be provided. The receiver must be able to operate with received frequency offsets of up to ± 7 Hz.

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