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SERIES V: DATA COMMUNICATION OVER THE TELEPHONE NETWORK

Simultaneous transmission of data and other signals

**A digital modem operating at data signalling
rates of up to 64 000 bit/s for use on a 4-wire
circuit switched connection and on leased
point-to-point 4-wire digital circuits**

ITU-T Recommendation V.91

(Previously CCITT Recommendation)



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ITU-T V-SERIES RECOMMENDATIONS
DATA COMMUNICATION OVER THE TELEPHONE NETWORK

General	V.1-V.9
Interfaces and voiceband modems	V.10-V.34
Wideband modems	V.35-V.39
Error control	V.40-V.49
Transmission quality and maintenance	V.50-V.59
Simultaneous transmission of data and other signals	V.60-V.99
Interworking with other networks	V.100-V.199
Interface layer specifications for data communication	V.200-V.249
Control procedures	V.250-V.299
Modems on digital circuits	V.300-V.399

For further details, please refer to ITU-T List of Recommendations.

ITU-T RECOMMENDATION V.91**A DIGITAL MODEM OPERATING AT DATA SIGNALLING RATES OF UP TO
64 000 bit/s FOR USE ON A 4-WIRE CIRCUIT SWITCHED CONNECTION
AND ON LEASED POINT-TO-POINT 4-WIRE DIGITAL CIRCUITS****Summary**

This Recommendation specifies the operation of a duplex digital modem for use on a 4-wire circuit switched connection and on leased point-to-point 4-wire digital circuits at data signalling rates of up to 64 000 bit/s. The modem is specified in terms of coding, start-up sequences, operating procedures and DTE-DCE interface functionalities. The modem includes an optional control channel and support for transparent mode on unrestricted 64 000 bit/s channels. The network interface of the modem and the signalling rate that is used to connect the modem locally to a 4-wire connection are considered to be national matters and are hence not specified.

Source

ITU-T Recommendation V.91 was prepared by ITU-T Study Group 16 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on 27 May 1999.

FOREWORD

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The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

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CONTENTS

	Page
1 Scope	1
2 References	1
3 Definitions	2
4 Abbreviations	2
5 Interchange circuits	2
5.1 List of interchange circuits	2
5.2 Asynchronous character-mode interfacing	3
6 Line signals.....	3
6.1 Data signalling rates	3
6.2 Symbol rate.....	3
6.3 Encoder for non-transparent mode	3
6.3.1 Scrambler	3
6.3.2 Mapping parameters.....	3
6.3.3 Input bit parsing	4
6.3.4 Modulus encoder.....	4
6.3.5 Mapper	4
6.3.6 Differential encoding	4
6.3.7 Sign assignment	5
6.3.8 Mux	5
6.3.9 Control channel bit assignment.....	5
6.4 Control channel	5
6.5 Encoder for transparent mode	5
7 Start-up sequences.....	6
7.1 B1	6
7.2 CP	6
7.3 DIL	8
7.4 E_u	9
7.5 E_s	9
7.6 E_z	9
7.7 E_m	9
7.8 INFO.....	9
7.9 J	10
7.10 PHIL	10
7.11 SCR	10

	Page
8 Operating procedures.....	10
8.1 Phase 1.....	10
8.2 V.91 start-up.....	11
8.2.1 Call and answer modem.....	11
8.3 Escape to V.34.....	12
8.3.1 Call modem.....	12
8.3.2 Answer modem.....	12
8.4 Retrains.....	13
8.4.1 Initiating retrain.....	13
8.4.2 Responding to retrain.....	13
8.5 Loss of frame synchronization.....	13
8.6 Cleardown.....	13
8.7 Transparent mode.....	13
8.8 Four-wire leased line operation.....	13
9 Testing facilities.....	13
10 Glossary.....	14
Appendix I – Typical network configuration.....	14

Recommendation V.91**A DIGITAL MODEM OPERATING AT DATA SIGNALLING RATES OF UP TO
64 000 bit/s FOR USE ON A 4-WIRE CIRCUIT SWITCHED CONNECTION
AND ON LEASED POINT-TO-POINT 4-WIRE DIGITAL CIRCUITS***(Geneva, 1999)***1 Scope**

This modem is specified herein in terms of coding, start-up signals and sequences, operating procedures and DTE-DCE interface functionalities. The network interface of the modem and the signalling rate that is used to connect the modem locally to a 4-wire connection are considered to be national matters and are hence not specified herein. The principal characteristics of the modem are as follows:

- a) duplex mode of operation on a 4-wire digital connection;
- b) channel separation by 4-wire connection;
- c) PCM modulation at a rate of 8000 symbols per second;
- d) synchronous channel data signalling rates from 28 000 bit/s to 64 000 bit/s in increments of 8000/6 bit/s;
- e) an optional control channel that uses 125 bit/s of the primary channel data signalling rate and allows for a 67.5 bit/s secondary channel data signalling rate;
- f) adaptive techniques that enable the modem to achieve close to the maximum data signalling rate that the channel can support on each connection;
- g) support of transparent mode on unrestricted 64 000 bit/s channels;
- h) exchange of rate sequences during start-up to establish the data signalling rate; and
- i) automoding to devices supporting V.8, and optionally V.8 bis, procedures.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations are subject to revision; all users of this Recommendation and other references are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

- CCITT Recommendation G.711 (1988), *Pulse code modulation (PCM) of voice frequencies*.
- ITU-T Recommendation V.8 (1998), *Procedures for starting sessions of data transmission over the public switched telephone network*.
- ITU-T Recommendation V.8 bis (1998), *Procedures for the identification and selection of common modes of operation between Data Circuit-terminating Equipments (DCEs) and between Data Terminal Equipments (DTEs) over the public switched telephone network and on leased point-to-point telephone-type circuits*.
- ITU-T Recommendation V.14 (1993), *Transmission of start-stop characters over synchronous bearer channels*.