

# INTERNATIONAL STANDARD

# IEC 61834-3

First edition  
1999-11

---

---

**Recording – Helical-scan digital video cassette  
recording system using 6,35 mm magnetic tape for  
consumer use  
(525-60, 625-50, 1125-60 and 1250-50 systems)**

**Part 3:  
HD format for 1125-60 and 1250-50 systems**

*Système de magnétoscope numérique à cassette à balayage  
hélicoïdal sur bande magnétique de 6,35 mm pour usage  
grand public  
(systèmes 525-60, 625-50, 1125-60 et 1250-50) –*

*Partie 3:  
Format HD pour les systèmes 1125-60 et 1250-50*

© IEC 1999 — Copyright - all rights reserved

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Electrotechnical Commission 3, rue de Varembé Geneva, Switzerland  
Telefax: +41 22 919 0300 e-mail: [inmail@iec.ch](mailto:inmail@iec.ch) IEC web site <http://www.iec.ch>



Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

PRICE CODE **XB**

*For price, see current catalogue*

## CONTENTS

	Page
FOREWORD .....	5
Clause	
1 General.....	7
1.1 Scope .....	7
1.2 Normative references .....	7
1.3 Definitions, symbols and abbreviations .....	7
1.4 Environment and test conditions .....	8
1.5 Reference tape .....	8
1.6 Calibration tape .....	8
2 Helical recordings .....	8
2.1 Tape speed.....	8
2.2 Record location and dimensions .....	8
3 Programme track data arrangement .....	9
3.1 Introduction.....	9
3.2 Labelling convention.....	9
3.3 Audio sector.....	9
3.4 Video sector.....	9
3.5 Subcode sector .....	9
4 Audio interface .....	9
5 Video interface .....	9
6 Audio signal processing.....	10
6.1 Introduction.....	10
6.2 Error correction code.....	10
6.3 Randomization pattern .....	10
6.4 Audio encoding .....	10
6.5 Audio channel allocation.....	10
6.6 Frame structure .....	11
6.7 Shuffling method .....	12
6.8 Audio auxiliary data (AAUX) .....	14
6.9 Invalid recording .....	14
7 Video signal processing.....	14
7.1 Introduction.....	14
7.2 Error correction code.....	14
7.3 Randomization pattern .....	14
7.4 Video structure.....	14
7.5 DCT processing .....	18
7.6 Quantization.....	18
7.7 Variable length coding (VLC) .....	19
7.8 Arrangement of a compressed macro block .....	19
7.9 Arrangement of a video segment.....	20
7.10 Data-sync block and compressed macro block .....	22
7.11 Video auxiliary data (VAUX) .....	22
7.12 Invalid recording .....	22

8	Subcode signal processing.....	22
8.1	The recording periods of TAG ID.....	22
8.2	The writing method of the optional area.....	23
8.3	The rewriting periods of TAG ID.....	23
9	System data.....	23
9.1	AAUX.....	23
9.2	VAUX.....	24
9.3	Subcode.....	25
9.4	MIC.....	25
10	Data structure for digital interface.....	25
10.1	Introduction.....	25
10.2	Data structure.....	25
10.3	DIF sequence.....	26
10.4	DIF block.....	26
10.5	Frame period.....	28
10.6	Playback speed.....	28
	Annex A (normative) 20 bits audio for professional use.....	57
A.1	Channel allocation.....	57
A.2	Encoding mode.....	57
A.3	Audio error code.....	57
A.4	Shuffling method.....	57
	Annex B (informative) Manufacturers.....	61
B.1	Reference tape.....	61
B.2	Calibration tape.....	61
B.3	Purchase.....	61
	Figure 1 – Sector arrangement on helical track (1125-60 and 1250-50 systems).....	30
	Figure 2 – 1125-60 system.....	30
	Figure 3 – 1250-50 system.....	31
	Figure 4 – Transmitting samples for 1125-60 system.....	37
	Figure 5 – Transmitting samples for 1250-50 system.....	38
	Figure 6 – DCT block and the pixel coordinates.....	38
	Figure 7 – DCT block arrangement.....	39
	Figure 8 – Macro block and DCT block order.....	39
	Figure 9 – Arrangement of macro blocks for 1125-60 system.....	40
	Figure 10 – Super blocks and macro blocks in a frame on TV screen for 1125-60 system.....	41
	Figure 11 – Super blocks and macro blocks in a frame on TV screen for 1250-50 system.....	42
	Figure 12 – Macro block order in a super block.....	43
	Figure 13 – Area number.....	43
	Figure 14 – The arrangement of a compressed macro block.....	44
	Figure 15 – The arrangement of a video segment after bit-rate reduction.....	45
	Figure 16 – The relation between the compressed macro block number and the data-sync block.....	46
	Figure 17 – Main area and optional area (1125-60 system).....	47
	Figure 18 – Main area and optional area (1250-50 system).....	48

	Page
Figure 19 – Data structure for transmission.....	50
Figure 20 – Transmission order of DIF blocks in a DIF sequence .....	51
Figure 21 – ID data in a DIF block.....	52
Figure 22 – Data in the header section.....	52
Figure A.1 –Sample to data bytes conversion for 20 bits .....	60
Table 1 – Record location and dimensions (1125-60 system, 1250-50 system) .....	28
Table 2 – Sector location from SSA (1125-60 system, 1250-50 system) .....	29
Table 3 – Scanner example (1125-60 system, 1250-50 system) .....	29
Table 4 – Sequence number (1125-60 and 1250-50 systems) .....	31
Table 5 – Track pair number (1125-60 system) .....	31
Table 6 – Track pair number (1250-50 system) .....	32
Table 7 – Construction of an audio block .....	32
Table 8 –Basic channel allocation rule in multi-stereo audio .....	33
Table 9 –Channel allocation rule for lumped audio .....	34
Table 10 – The number of audio samples per frame (unlocked mode) .....	35
Table 11 – The allowance range of the accumulated difference value between the numbers of audio samples per frame in synchronous channels.....	35
Table 12 –The number of audio samples per frame (locked mode) .....	35
Table 13 – The construction of video signal sampling (12:4:4).....	36
Table 14 – An example of the classification for reference .....	43
Table 15 – Quantization step .....	44
Table 16 – AAUX data of the main area .....	49
Table 17 – VAUX data of the main area .....	49
Table 18 – TIA data in the header section .....	53
Table 19 – DIF blocks and subcode sync blocks .....	53
Table 20 – DIF blocks and VAUX data-sync blocks .....	54
Table 21 – DIF blocks and audio data-sync blocks .....	55
Table 22 – DIF blocks and compressed macro blocks .....	56
Table A.1 – Basic channel allocation rule .....	60

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

### **RECORDING – HELICAL-SCAN DIGITAL VIDEO CASSETTE RECORDING SYSTEM USING 6,35 mm MAGNETIC TAPE FOR CONSUMER USE (525-60, 625-50, 1125-60 and 1250-50 systems) –**

#### **Part 3: HD format for 1125-60 and 1250-50 systems**

### FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61834-3 has been prepared by subcommittee 100B: Audio, video and multimedia information storage systems, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

The text of this standard is based on the following documents:

FDIS	Report on voting
100B/233/FDIS	100B/245/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

IEC 61834 consists of the following parts, under the general title *Recording – Helical-scan digital video cassette recording system using 6,35 mm magnetic tape for consumer use (525-60, 625-50, 1125-60 and 1250-50 systems)*

- Part 1: General specifications;
- Part 2: SD format for 525-60 and 625-50 systems;
- Part 3: HD format for 1125-60 and 1250-50 systems;
- Part 4: The pack header table and the contents;
- Part 5: The character information system.

The basic principles and rules of this part 3 are based on the set of specifications to be adopted by the HD Digital VCR Conference.

This part 3 describes the helical-scan digital video cassette recording system using 6,35 mm magnetic tape for consumer use.

Part 1 describes the common specifications for the helical-scan digital video cassette recording system using 6,35 mm magnetic tape.

Part 2 describes the specifications for 525-60 and 625-50 systems which are not included in part 1.

Part 4 describes the pack header table and the contents of packs which are applicable to the whole recording system of helical-scan digital video cassette.

Part 5 describes the character information system which is applicable to the whole recording system of helical-scan digital video cassette.

For manufacturing SD digital video cassette recording systems, parts 1, 2, 4 and 5 are referred to.

For manufacturing HD digital video cassette recording systems, parts 1, 2, 3, 4 and 5 are referred to.

Annex A forms an integral part of this standard.

Annex B is for information only.

The committee has decided that this publication remains valid until 2004. At this date, in accordance with the committee's decision, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

A bilingual version of this standard may be issued at a later date.

# RECORDING – HELICAL-SCAN DIGITAL VIDEO CASSETTE RECORDING SYSTEM USING 6,35 mm MAGNETIC TAPE FOR CONSUMER USE (525-60, 625-50, 1125-60 and 1250-50 systems) –

## Part 3: HD format for 1125-60 and 1250-50 systems

### 1 General

#### 1.1 Scope

The main object of this part of IEC 61834 is to establish basic principles applicable to the next generation of digital video cassette recording systems for consumer use for the interest of both users and manufacturers.

This part of IEC 61834 specifies the content, format and recording method of the data blocks forming the helical records on the tape containing audio, video, and system data. It describes the specifications for the 1125-line system with a frame frequency of 30,00 Hz (hereinafter referred to as the "1125-60 system") and the 1250-line system with a frame frequency of 25,00 Hz (hereinafter referred to as the "1250-50 system") which are not included in parts 1 and 2. One video channel and four independent audio channels are recorded in the digital format. Each of these channels is designed to be capable of independent editing. The video channel records and reproduces a component television signal in the 1125-60 and 1250-50 systems.

In part 3, the data structure of a track is defined by APT = 000b which consists of four areas as described in 4.3.2 in part 1 and AP1 = AP2 = AP3 = 000b. The data structure of MIC is the same as clause 10 in IEC 61834-2.

#### 1.2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 61834. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 61834 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 61834-2:1998, *Recording – Helical-scan digital video cassette recording system using 6,35 mm magnetic tape for consumer use (525-60, 625-50, 1125-60 and 1250-50 systems) – Part 2: SD format for 525-60 and 625-50 systems*

ITU-R Recommendation BT.709-3:1998, *Parameter values for the HDTV standards for production and international programme exchange*

ITU-R Recommendation BS.775-1:1993, *Multi-channel stereophonic sound systems with and without accompanying picture*