

INTERNATIONAL STANDARD

IEC
62330-1

First edition
2003-05

**Helical-scan digital video cassette recording
system using 12,65 mm (0,5 in) magnetic tape –
Format HD-D5 –**

**Part 1:
VTR specifications**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HELICAL-SCAN DIGITAL VIDEO CASSETTE RECORDING SYSTEM
USING 12,65 mm (0,5 in) MAGNETIC TAPE – FORMAT HD-D5 –**
Part 1: VTR specifications

FOREWORD

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International Standard IEC 62330-1 has been prepared by Technical Area 6: Higher data rate storage media and equipment of IEC technical committee 100: Audio, video and multimedia systems and equipment.

It was submitted to the national committees for voting under the Fast Track Procedure as the following documents:

CDV	Report on voting
100/504/CDV	100/603/RVC

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 2.

The committee has decided that the contents of this publication will remain unchanged until 2008. At this date, the publication will be

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- withdrawn;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

IEC 62330 consists of the following parts, under the general title *Helical-scan digital video cassette recording system using 12,65 mm (0,5 in) magnetic tape – Format HD-D5*.

Part 1: VTR specifications

Part 2: Compression format

Part 3: Data stream format

This part 1 describes the VTR specifications which are tape, magnetization, helical recording, modulation method and basic system data for high definition video compressed data on 29,97 or 59,94 frame rate.

Part 2 describes the specifications for encoding process and data format for 1080i and 720p systems.

Part 3 describes the specifications for transmission of HD-D5 compressed video and audio data stream over 360 Mb/s serial digital interface.

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HELICAL-SCAN DIGITAL VIDEO CASSETTE RECORDING SYSTEM USING 12,65 mm (0,5 in) MAGNETIC TAPE – FORMAT HD-D5 –

Part 1: VTR specifications

1 Scope

This part of IEC 62330 specifies the content, format, and recording method of the data blocks containing HD compressed video data defined in part 2, audio, and associated data which form the helical records on 12,65 mm (0,5 in) tape in cassettes as specified in IEC 61835.

In addition, this standard specifies the content, format, and recording method of the longitudinal record containing tracking information for the scanning head associated with the helical records, and also the longitudinal cue audio, and time and control code.

One video channel of HD compressed video data and four independent audio channels are recorded in the digital format. Each of these channels is designed to be capable of independent editing.

The HD compressed video data are derived from the following HD video signal:

- 1080 line / 59,94 Hz field frequency interlace system
- 720 line / 59,94 Hz frame frequency progressive system

Figure 1 and Figure 2 show block diagrams of the processes involved in the recorder.

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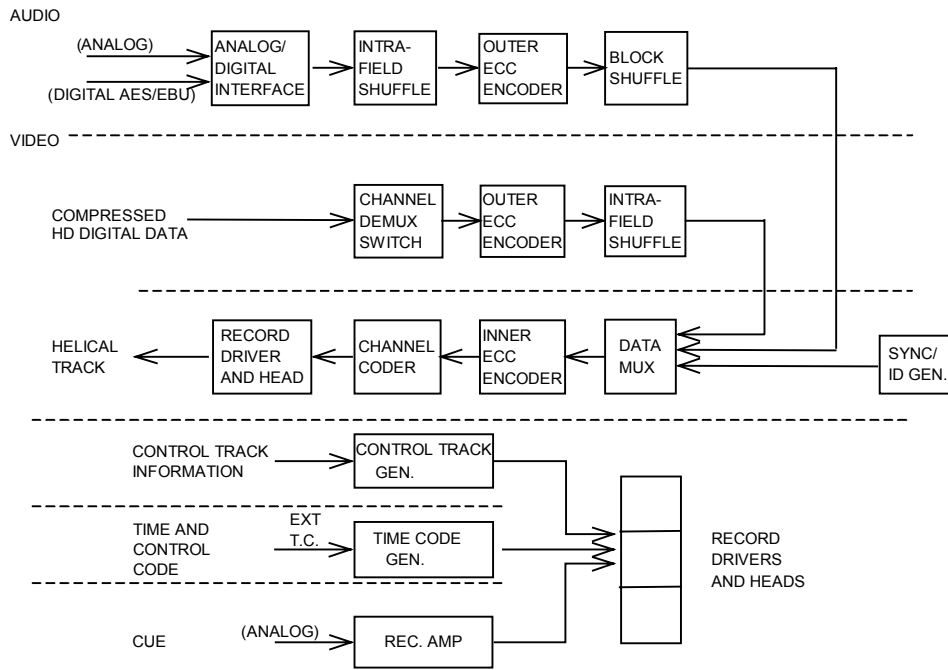


Figure 1 – Record block diagram
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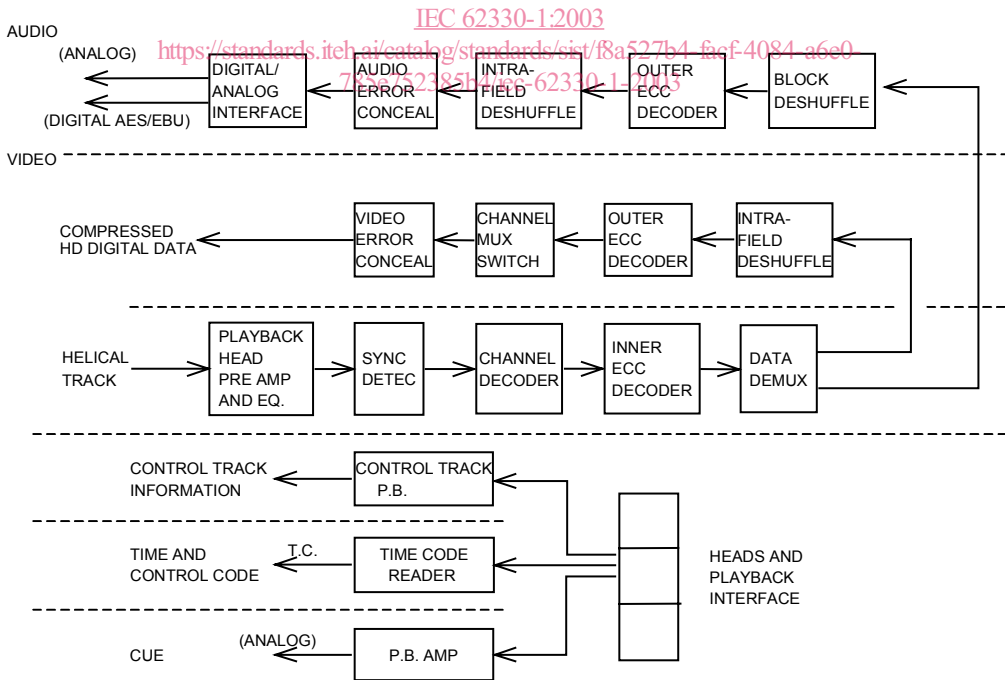


Figure 2 – Playback block diagram

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60461:2001, *Time and control code for video tape recorders*

IEC 60958, *Digital audio interface*

IEC 61835, *Helical-scan digital component video cassette recording system using 12,65 mm (0,5 in) magnet tape – Format D-5*

ITU-R BS. 647 *A digital audio interface for broadcasting studios*

SMPTE RP 155:1995, *Audio levels and Indicators for Digital Audio Records on Digital Television Tape Recorders*

3 Environment and test conditions

3.1 Environment

Tests and measurements made on the system to check the requirements of this standard shall be carried out under the following conditions:

Temperature	20 °C ±1 °C
Relative humidity	(50 ±2) %
Barometric pressure	from 86 kPa to 106 kPa
Tape conditioning	not less than 24 h
Centre tape tension	0,31 N ±0,05 N (see Annex A)

3.2 Reference tape

Blank tape for reference recordings should be available from any source meeting the tape characteristics as portrayed by this standard.

3.3 Calibration tape

The calibration tapes meeting the requirements of 3.3.1 and Clause 4 should be available from manufacturers who produce DTTRs and players in accordance with this standard.

3.3.1 Record locations and dimensions

Tolerances shown in Table 1 will be reduced by 50 %.

3.3.2 Calibration signals

Two sets of signals should be recorded on the calibration tape:

- a) Video: 100 % colour bars
- Audio: 1 kHz tone at 20 dB below full scale on each of audio channels
- Cue: 1 kHz tone at reference level; 10 kHz tone at reference level

- b) A signal of constant recorded frequency (i.e. one-half the Nyquist frequency) shall be recorded only on tracks of field 0, segment 0 for the purpose of mechanical alignment. Recording level should conform to 6.6.3.

4 Video tape

4.1 Base

The base material shall be polyester or equivalent.

4.2 Width

The tape width shall be 12,650 mm \pm 0,008 mm.

The tape, covered with glass, is measured without tension at a minimum of five different positions along the tape using a calibrated comparator having an accuracy of 0,001 mm (1 μ m). The tape width is defined as the average of the five readings.

4.3 Width fluctuation

Tape width fluctuation shall not exceed 5 μ m peak to peak. Measurement of tape width fluctuation shall be taken over a tape length of 900 mm. The value of tape width fluctuation shall be evaluated by measuring the tape width at 10 points, each separated by a distance of 100 mm.

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4.4 Tape thickness

Two types of tape thickness shall be permitted by this standard. The first tape thickness shall be 10,2 μ m to 11,0 μ m (referred to as 11 μ m); the second tape thickness shall be 13,0 μ m to 14,0 μ m (referred to as 14 μ m).

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4.5 Transmissivity

Transmissivity shall be less than 5 %, measured over the range of wavelengths 800 nm to 900 nm.

4.6 Offset yield strength

The offset yield strength shall be greater than 9 N for 11 μ m tape and 10 N for 14 μ m tape. The force required to produce 0,2 % elongation of a 1 000 mm test sample with a pull rate of a 10 mm per minute shall be used to confirm the offset yield strength. The line beginning at 0,2 % elongation parallel to the initial tangential slope is drawn and then read at the point of intersection of the line and the stress-strain curve.

4.7 Magnetic coating

The magnetic layer of the tape shall consist of a coating of metal particles or equivalent.

4.8 Coating coercivity

The coating coercivity shall be a class 1 800 (144 000 A/m) with an applied field of 400 000 A/m (5 000 Oe) as measured by a 50 Hz or 60 Hz B-H meter or vibrating sample magnetometer (VSM).

4.9 Particle orientation

The metal particles shall be longitudinally oriented.

5 Helical recordings

5.1 Tape speed

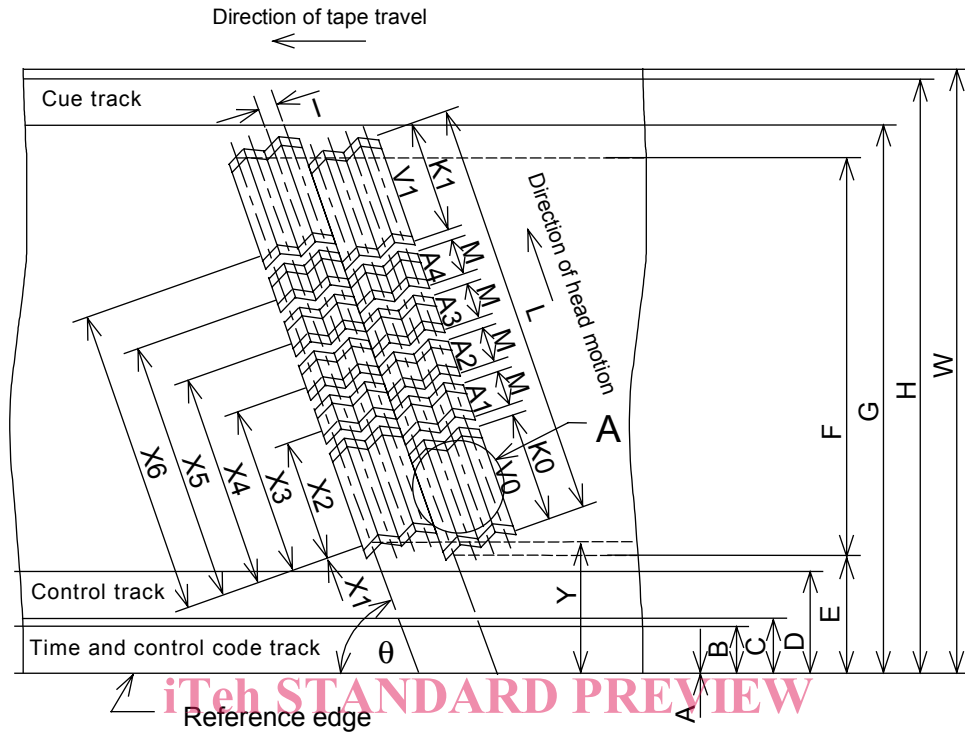
The tape speed shall be 167,228 mm/s. The tolerance shall be $\pm 0,2$ %.

5.2 Record location and dimensions

- 5.2.1** The format requires full-width erasure for continuous recording and flying erasure for insert editing.
- 5.2.2** Record location and dimensions for continuous recording shall be as specified in Figure 3, Figure 4 and Table 1. In recording, sector locations on each helical track shall be contained within the tolerance specified in Figure 3 and Table 1.
- 5.2.3** The reference edge of the tape for record location dimensions specified in this standard shall be the lower edge as shown in Figure 3. The magnetic coating, with the direction of tape travel as shown in Figure 3, is on the side facing the observer (measuring techniques are shown in Annex B).
- 5.2.4** As indicated in Figure 3, this standard anticipates a zero guard band between recorded tracks, and the record head width should be equivalent to the track pitch of 20 μm . The scanner head configuration should be chosen so that the recorded track widths are contained within the limits of 18 μm to 22 μm .
- 5.2.5** In insert editing, this standard provides a guard band of 2 μm (nominal) between the previously recorded track and the inserted track at editing points only. A typical track pattern for insert editing is shown in Figure C.1.

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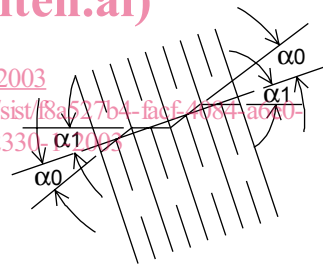


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Detail A



- NOTE 1 A1, A2, A3, and A4 are audio sectors.
- NOTE 2 V0 and V1 are video sectors.
- NOTE 3 Tape viewed from magnetic coating side.
- NOTE 4 Dimensions X1 to X6 are determined by the programme reference point as defined in Figure 4.

Figure 3 – Location and dimensions of recorded tracks

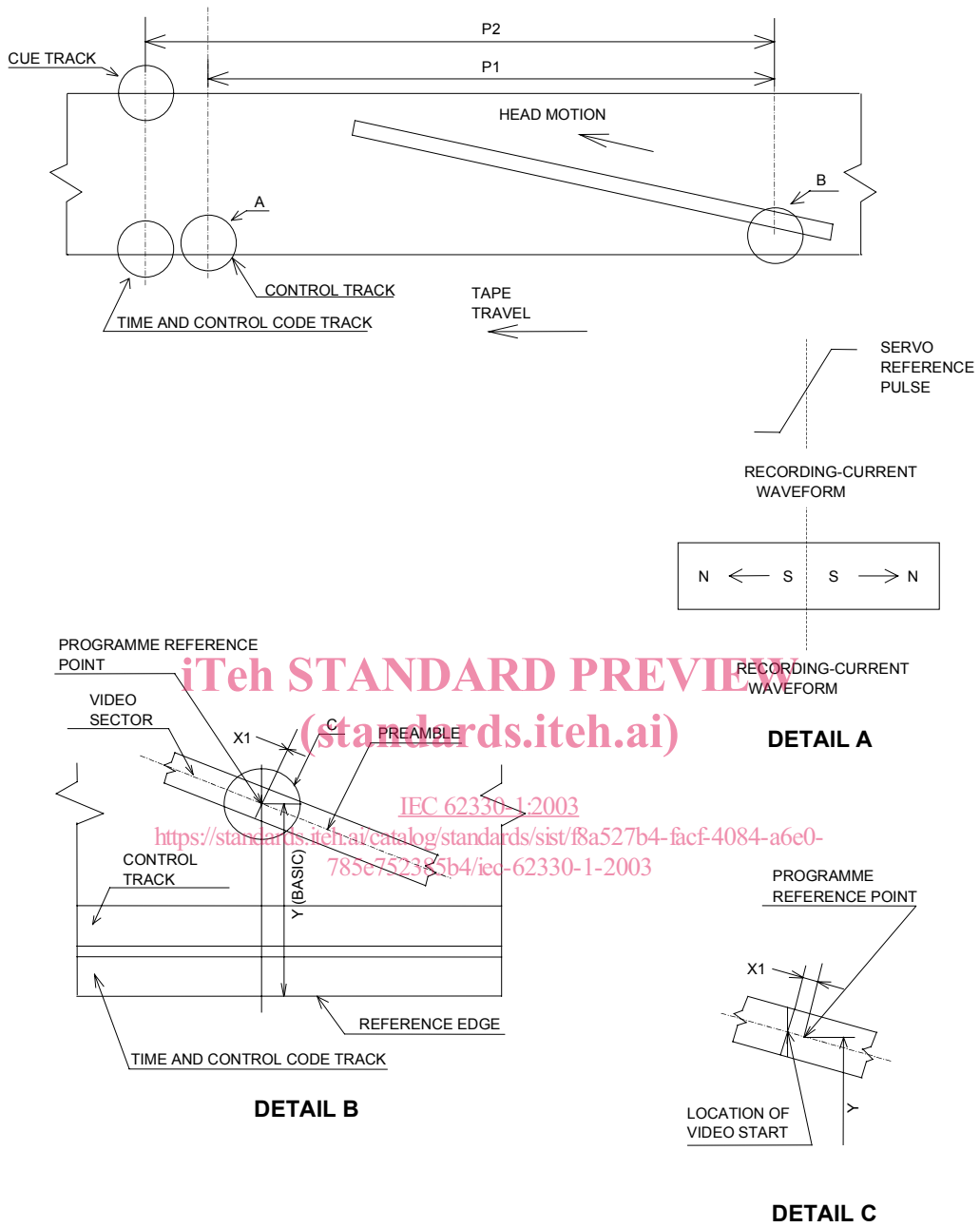


Figure 4 – Location of cue and time and control code track record