

INTERNATIONAL STANDARD

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First edition
2005-10

**Helical-scan compressed digital video
cassette system using 6,35 mm
magnetic tape – Format D-7 –**

**Part 2:
Compression format**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HELICAL-SCAN COMPRESSED DIGITAL VIDEO CASSETTE SYSTEM
USING 6,35 mm MAGNETIC TAPE – FORMAT D-7 –**
Part 2: Compression format

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International Standard IEC 62071-2 has been prepared by technical area 6: Higher data rate storage media, data structures and equipment of IEC technical committee 100: Audio, video and multimedia systems and equipment.

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

| | |
|-------------|------------------|
| CDV | Report on voting |
| 100/901/CDV | 100/985/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.

IEC 62071 consists of the following parts, under the general title *Helical-scan compressed digital video cassette system using 6,35 mm magnetic tape – Format D-7*:

Part 1: VTR specifications

Part 2: Compression format

Part 3: Data stream format

This part 2 describes the specifications for encoding process and data format for 525i and 625i systems.

Part 1 describes the VTR specifications which are tape, magnetization, helical recording, modulation method and basic system data for video compressed data.

Part 3 describes the specifications for transmission of DV-based compressed video and audio data stream over 270Mb/s and 360 Mb/s serial digital interface.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
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HELICAL-SCAN COMPRESSED DIGITAL VIDEO CASSETTE SYSTEM USING 6,35 mm MAGNETIC TAPE – FORMAT D-7 –

Part 2: Compression format

1 Scope

This part of IEC 62071 defines the DV-based data structure for the interface of digital audio, subcode data and compressed video with the following parameters:

525/60 system – 4:1:1 image sampling structure, 25 Mb/s data rate;

525/60 system – 4:2:2 image sampling structure, 50 Mb/s data rate;

625/50 system – 4:1:1 image sampling structure, 25 Mb/s data rate;

625/50 system – 4:2:2 image sampling structure, 50 Mb/s data rate.

This standard does not define the DV compliant data structure for interface, of digital audio, subcode data and compressed video with the following parameters:

625/50 system – 4:2:0 image sampling structure, 25 Mb/s data rate

The compression algorithm and the DIF structure conform to the DV data structure as defined in IEC 61834. Differences between the DV-based data structure defined in this standard and IEC 61834 are shown in Annex A.

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.

ITU-R BT.601-5: 1995, *Studio encoding parameters of digital television for standard 4:3 and wide-screen 16:9 aspect ratios*

AES3-2003: *Serial transmission format for two-channel linearly represented digital audio data*

SMPTE 12M: 1999, *Television, Audio and Film – Time and Control Code*

3 Abbreviations and acronyms

| | |
|------|-----------------------------------|
| AAUX | Audio auxiliary data |
| AP1 | Audio application ID |
| AP2 | Video application ID |
| AP3 | Subcode application ID |
| APT | Track application ID |
| Arb | Arbitrary |
| AS | AAUX source pack |
| ASC | AAUX source control pack |
| B/W | Black and white flag |
| CGMS | Copy generation management system |

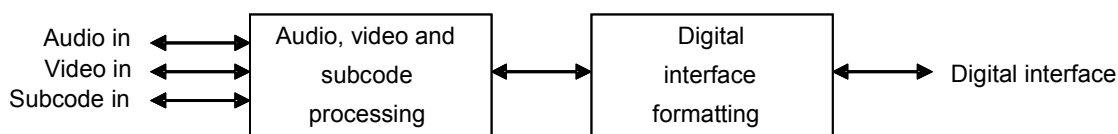
| | |
|------------------|--|
| CM | Compressed macro block |
| DBN | DIF block number |
| DCT | Discrete cosine transform |
| DIF | Digital interface |
| DRF | Direction flag |
| Dseq | DIF sequence number |
| DSF | DIF sequence flag |
| DV | Identification of a compression family |
| EFC | Emphasis audio channel flag |
| EOB | End of block |
| FR | Identification for the first half or the second half of each channel |
| FSC | Identification of a DIF block in each channel |
| LF | Locked mode flag |
| QNO | Quantization number |
| QU | Quantization |
| Res | Reserved for future use |
| SCT | Section type |
| SMP | Sampling frequency |
| SSYB | Subcode sync block |
| STA | Status of the compressed macro block |
| STYPE (see Note) | Signal type |
| Syb | Subcode sync block number |
| TF | Transmitting flag |
| VAUX | Video auxiliary data |
| VLC | Variable length coding |
| VS | VAUX source pack |
| VSC | VAUX source control pack |

NOTE STYPE as used in this standard is different from that in ANSI/IEEE 1394.

4 Interface

4.1 General

As shown in Figure 1, processed audio, video and subcode data, are output for different applications through a digital interface port.



IEC 1905/05

Figure 1 – Block diagram on the digital interface

4.2 Data structure

The data structure of the compressed stream at the digital interface is shown in Figures 2 and 3. Figure 2 shows the data structure for a 50 Mb/s structure, and Figure 3 shows the data structure for a 25 Mb/s structure.

In the 50 Mb/s structure, the data of one video frame are divided into two channels. Each channel is divided into 10 DIF sequences for the 525/60 system and 12 DIF sequences for the 625/50 system.

In the 25 Mb/s structure, the data of one video frame are divided into 10 DIF sequences for the 525/60 system and 12 DIF sequences for the 625/50 system.

Each DIF sequence consists of a header section, subcode section, VAUX section, audio section and video section with the following DIF blocks respectively:

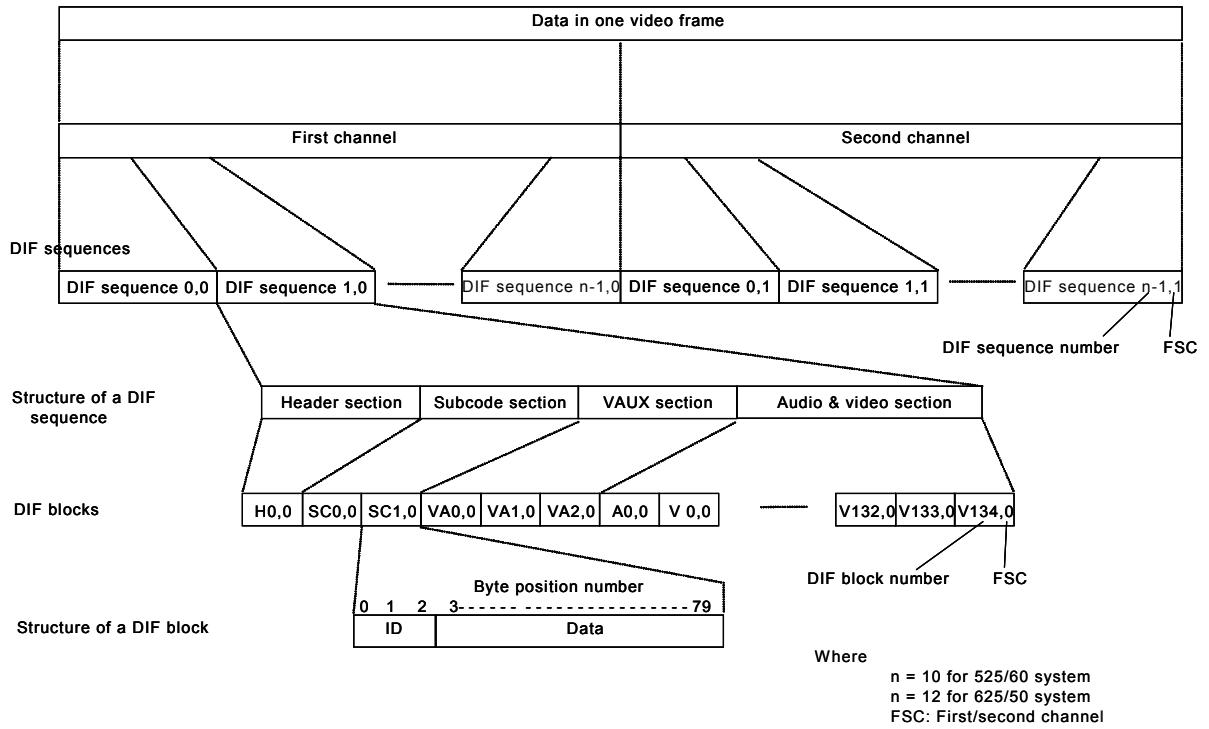
| | | |
|-----------------|---|-----------------|
| Header section | : | 1 DIF block, |
| Subcode section | : | 2 DIF blocks, |
| VAUX section | : | 3 DIF blocks, |
| Audio section | : | 9 DIF blocks, |
| Video section | : | 135 DIF blocks. |

As shown in Figures 2 and 3, each DIF block consists of a 3-byte ID and 77 bytes of data. DIF data bytes are numbered 0 to 79.

Figure 4 shows the data structure of a DIF sequence for a 50 Mb/s or 25 Mb/s structure.

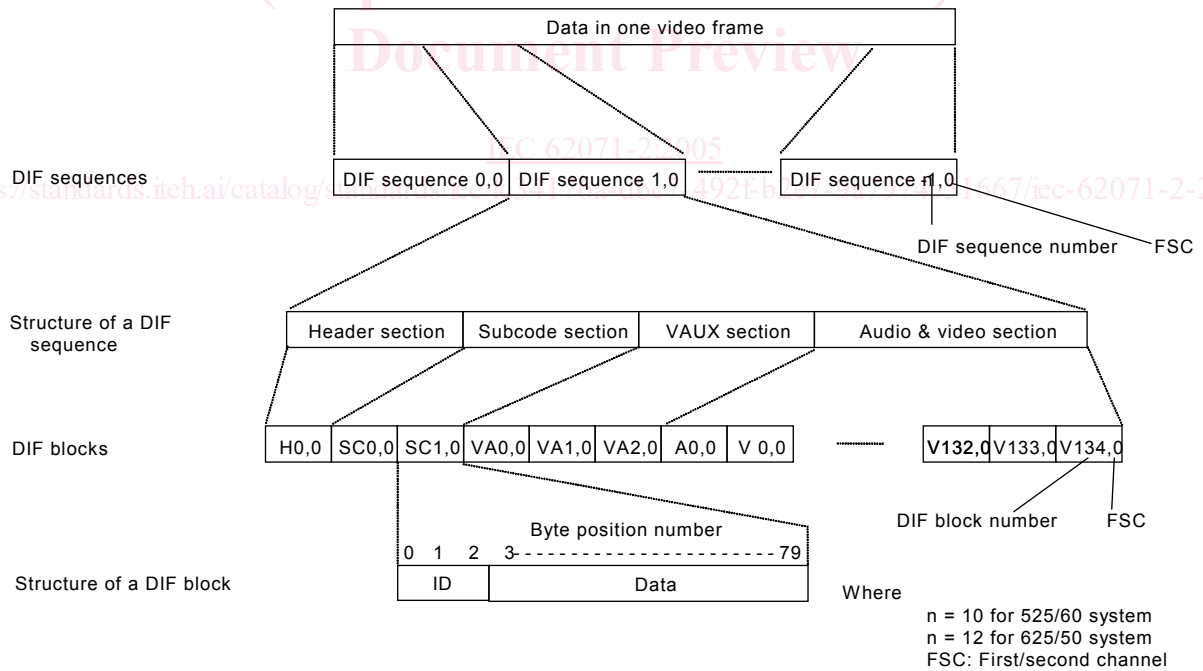
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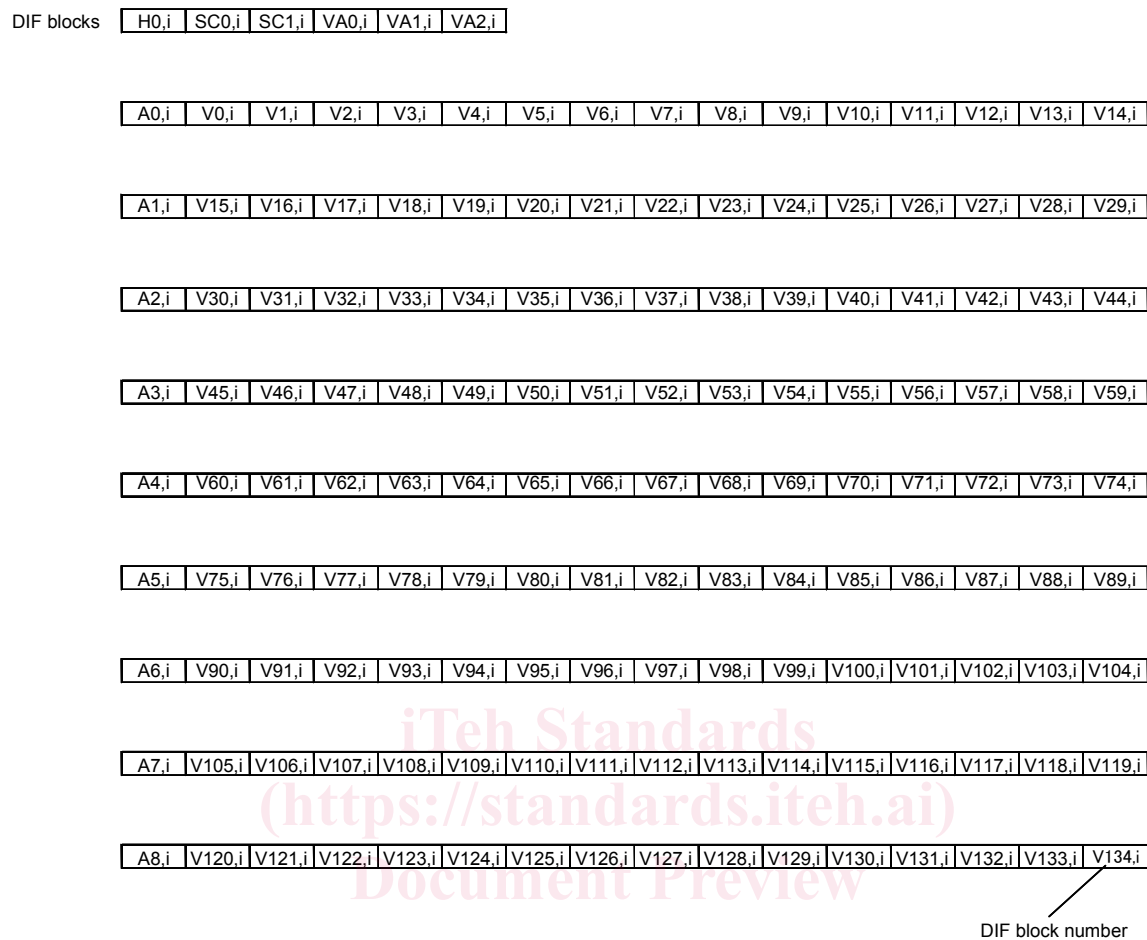
IEC 1906/05

Figure 2 – Data structure of one video frame for 50 Mb/s structure



IEC 1907/05

Figure 3 – Data structure of one video frame for 25 Mb/s structure



IEC 62071-2:2005

IEC 1908/05

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where

- i : FSC
 i = 0 for 25 Mb/s structure
 i = 0,1 for 50 Mb/s structure
- H0,i : DIF block in header section
- SC0,i to SC1,i : DIF blocks in subcode section
- VA0,i to VA2,i : DIF blocks in VAUX section
- A0,i to A8,i : DIF blocks in audio section
- V0,i to V134,i : DIF blocks in video section

Figure 4 – Data structure of a DIF sequence

4.3 Header section

4.3.1 ID

The ID part of each DIF block in the header section, shown in Figures 2 and 3, consists of 3 bytes (ID0, ID1, ID2). Table 1 shows the ID content of a DIF block.

Table 1 – ID data of a DIF block

| | | Byte position number | | |
|-----|------------------|----------------------|------------------|-----------------|
| | | Byte 0 (ID0) | Byte 1 (ID1) | Byte 2 (ID2) |
| MSB | SCT ₂ | Dseq ₃ | DBN ₇ | |
| | SCT ₁ | Dseq ₂ | DBN ₆ | |
| | SCT ₀ | Dseq ₁ | DBN ₅ | |
| | Res | Dseq ₀ | DBN ₄ | |
| | Arb | FSC | DBN ₃ | |
| | Arb | Res | DBN ₂ | |
| | Arb | Res | DBN ₁ | |
| LSB | Arb | Res | DBN ₀ | |

The ID contains the following:

- SCT: Section type (see Table 2)
- Dseq: DIF sequence number (see Tables 3 and 4)
- FSC: Identification of a DIF block in each channel
 - 50 Mb/s structure
 - FSC = 0: first channel
 - FSC = 1: second channel
 - 25 Mb/s structure
 - FSC = 0
- DBN: DIF block number (see Table 5)
- Arb: Arbitrary bit
- Res: Reserved bit for future use
 - Default value shall be set to 1.