

for Television — Data Structure for DV-Based Audio, Data and Compressed Video at 100 Mb/s 1080/60i, 1080/50i, 720/60p, 720/50p



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1 Scope

This standard defines the data structure for the interface of DV-based digital audio, subcode data, and compressed video at 100 Mb/s. The standard defines the processes required to decode the DV-based data structure into eight channels of AES-3 digital audio at 48 kHz, subcode data, and high-definition video at 1080/60i, 1080/50i, 720/60p and 720/50p.

The following high-definition video parameters are used in this standard:

1080/60i system –

Input video format: 1920 x 1080 image sampling structure, 59.94-Hz field rate, interlace format.

Compressed video data rate: 100 Mb/s

1080/50i system –

Input video format: 1920 x 1080 image sampling structure, 50-Hz field rate, interlace format.

Compressed video data rate: 100 Mb/s

720/60p system –

Input video format: 1280 x 720 image sampling structure, 59.94-Hz frame rate, progressive format.

Compressed video data rate: 100 Mb/s

720/50p system –

Input video format: 1280 x 720 image sampling structure, 50-Hz frame rate, progressive format.

Compressed video data rate: 100 Mb/s

In this standard, the term 60-Hz system refers to both 1080/60i and 720/60p systems, and the term 50-Hz system refers to both 1080/50i and 720/50p systems. The term 1080-line system refers to both 1080/60i and 1080/50i systems, and the term 720-line system refers to both 720/60p and 720/50p systems.

2 Normative references

The following standards, through reference in this text, constitute provisions of this standard. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

AES3-2003, Serial Transmission Format for Two-Channel Linearly Represented Digital Audio Data

SMPTE 12M-1999 Television, Audio and Film — Time and Control Code

SMPTE 260M-1999, Television — 1125/60 High-Definition Production System — Digital Representation and Bit-Parallel Interface

SMPTE 274M-2005, Television — 1920 x 1080 Image Sample Structure, Digital Representation and Digital Timing Reference Sequences for Multiple Picture Rates

SMPTE 296M-2001, Television — 1280 x 720 Progressive Image Sample Structure — Analog and Digital Representation and Analog Interface

SMPTE 321M-2002, Television — Data Stream Format for the Exchange of DV-Based Audio, Data and Compressed Video over a Serial Data Transport Interface

3 Data processing

3.1 General

As shown in figure 1, the processed audio, video and subcode data are output for the recording on a Type D-12 recorder. Additionally these data are multiplexed in the DIF (digital interface) format data to output for

different applications through a digital interface port. Details of the process shown in figure 1 are described in clauses 3 and 4. Dotted lines are related to the data flow described in the Type D-12 document.

Annex A shows the block diagram of the Type D-12 recorder. Figure A.1 shows the part defined by this compression format document.

3.1.1 Video encoding parameter

The source component signal to be processed shall comply with the video parameters as defined by SMPTE 274M and SMPTE 296M.

3.1.2 Audio encoding parameter

The audio signal shall be sampled at 48 kHz, with 16-bit quantization defined by AES3.

3.1.3 Subcode data

The time code format in the subcode area shall be the LTC codeword and comply with SMPTE 12M.

3.1.4 Frame structure

In the 1080-line system, video data, audio data, and subcode data in one video frame shall be processed in each frame. In the 720-line system, these data in two video frames shall be processed within one frame duration of the 1080-line system. Consequently, audio data and subcode data in the 720-line system are processed in the same way as the 1080-line system. The audio data corresponding to one video frame in the 1080-line system and two video frames in the 720-line system is defined as an audio-processing unit.

Each frame of time code shows a frame number that corresponds to each video frame in the 1080-line system, and two video frames each in the 720-line system. Therefore, time codes of the 1080-line and 720-line system are the same.

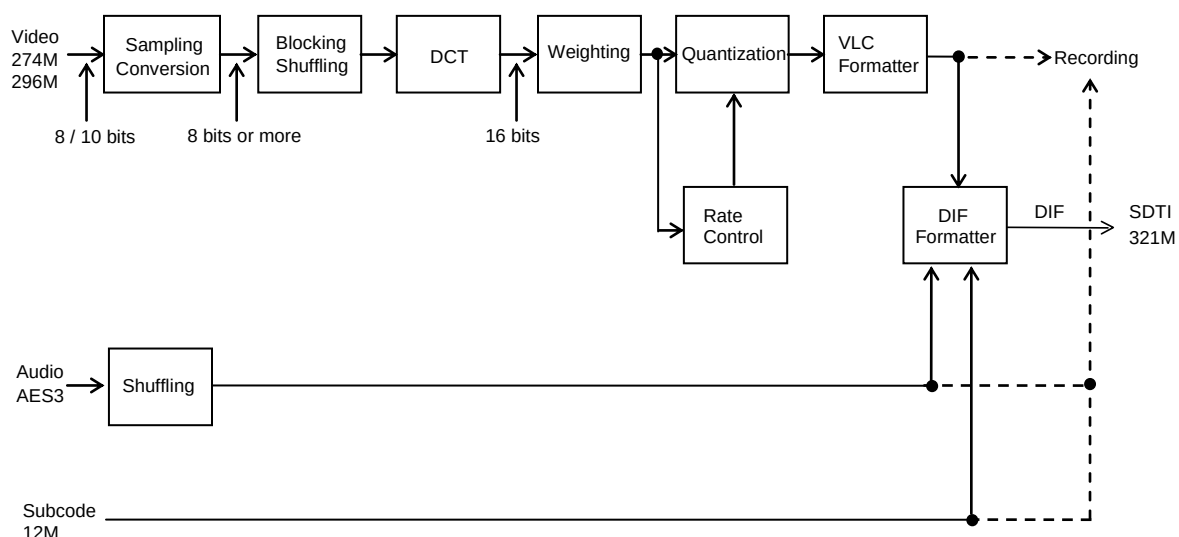


Figure 1 – Data processing block diagram

3.2 Data structure

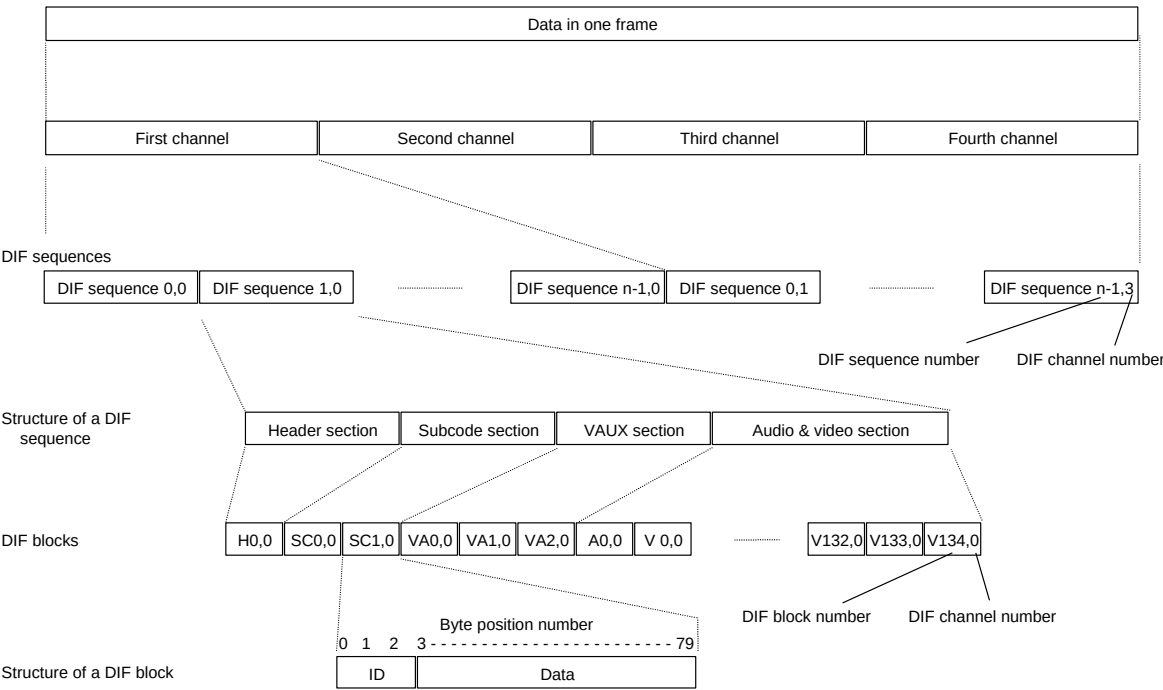
The data structure of the compressed stream at the digital interface is shown in figure 2. The data of each frame shall be divided into four DIF channels.

Each DIF channel shall be divided into 10 DIF sequences for the 60-Hz system and 12 DIF sequences for the 50-Hz system.

Each DIF sequence shall consist 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

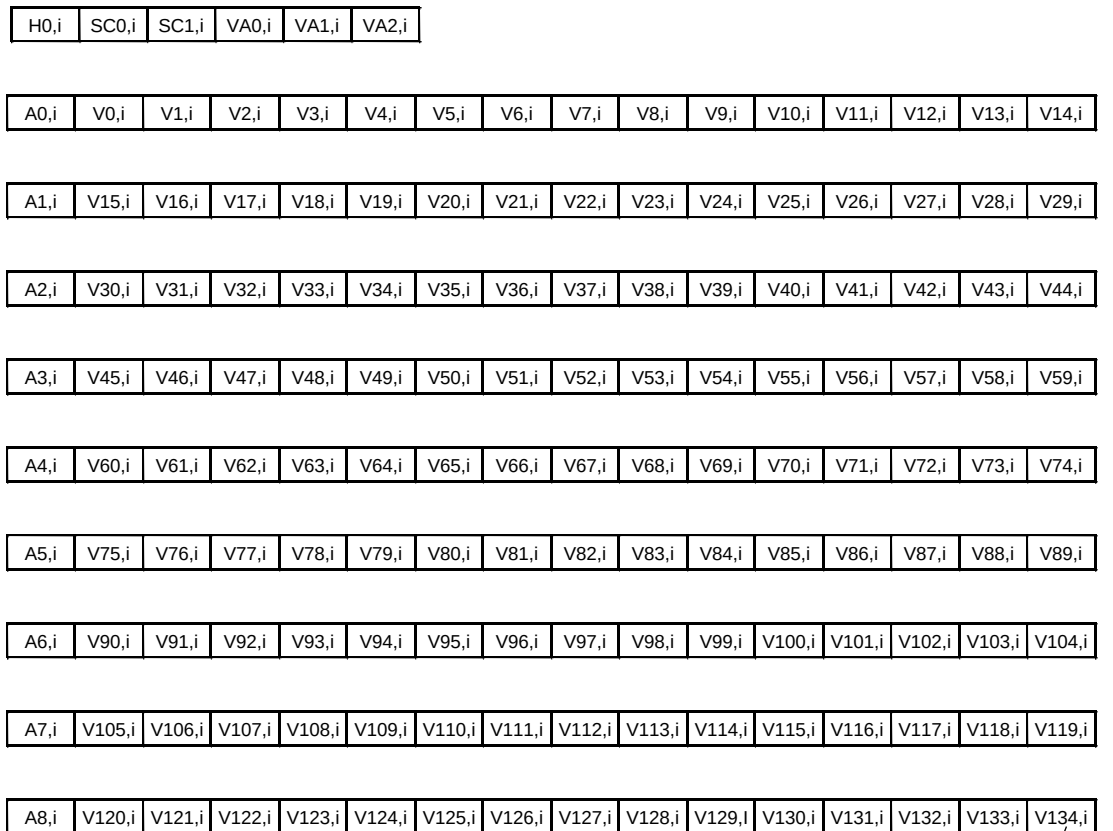
As shown in figure 2, each DIF block shall consist of a 3-byte ID and 77 bytes of data. The DIF data bytes are numbered 0 to 79. Figure 3 shows the data structure of a DIF sequence.



where
n = 10 for 60-Hz system
n = 12 for 50-Hz system

Figure 2 – Data structure

DIF blocks



DIF block number

where

i: DIF channel number

i = 0,1,2,3

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 3 – Data structure of a DIF sequence

3.3 Header section

3.3.1 ID

The ID part of each DIF block in the header section, shown in figure 2, shall consist 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			
	0 ID0	1 ID1	2 ID2
MSB	SCT2	Dseq3	DBN7
	SCT1	Dseq2	DBN6
	SCT0	Dseq1	DBN5
	Res	Dseq0	DBN4
	Arb	FSC	DBN3
	Arb	FSP	DBN2
	Arb	Res	DBN1
LSB	Arb	Res	DBN0

The ID contains the followings :

SCT: Section type (see table 2)
Dseq: DIF sequence number (see tables 3 and 4)
FSC, FSP: Channel identification of a DIF block (see table 5)
NOTE – FSP bit is reserved in SMPTE 314M
DBN: DIF block number (see table 6)
Arb: Arbitrary bit
Res: Reserved bit for future use
Default value shall be set to 1

Table 2 – Section type

Section type bit			Section type
SCT2	SCT1	SCT0	
0	0	0	Header
0	0	1	Subcode
0	1	0	VAUX
0	1	1	Audio
1	0	0	Video
1	0	1	Reserved
1	1	0	
1	1	1	

Table 3 – DIF sequence number for the 60-Hz system

DIF sequence number bit				DIF sequence number
Dseq3	Dseq2	Dseq1	Dseq0	
0	0	0	0	0
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	7
1	0	0	0	8
1	0	0	1	9
1	0	1	0	Not used
1	0	1	1	Not used
1	1	0	0	Not used
1	1	0	1	Not used
1	1	1	0	Not used
1	1	1	1	Not used

Table 4 – DIF sequence number for the 50-Hz system

DIF sequence number bit				DIF sequence number
Dseq3	Dseq2	Dseq1	Dseq0	
0	0	0	0	0
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	7
1	0	0	0	8
1	0	0	1	9
1	0	1	0	10
1	0	1	1	11
1	1	0	0	Not used
1	1	0	1	Not used
1	1	1	0	Not used
1	1	1	1	Not used

Table 5 – DIF channel number

FSC	FSP	DIF channel number
0	1	0: first channel
1	1	1: second channel
0	0	2: third channel
1	0	3: fourth channel

Table 6 – DIF block number

DIF block number bit								DIF block number
DBN7	DBN6	DBN5	DBN4	DBN3	DBN2	DBN1	DBN0	
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	1	1
0	0	0	0	0	0	1	0	2
0	0	0	0	0	0	1	1	3
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
1	0	0	0	0	1	1	0	134
1	0	0	0	0	1	1	1	Not used
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
1	1	1	1	1	1	1	1	Not used

3.3.2 Data

The data part (payload) of each DIF block in the header section is shown in table 7. Bytes 3 to 7 are active and bytes 8 to 79 are reserved.

Table 7 - Data (payload) in the header section

		Byte position number						
		3	4	5	6	7	8	79
MSB	DSF	Res	TF1	TF2	TF3	Res	-----	Res
	0	Res	Res	Res	Res	Res	-----	Res
	Res	Res	Res	Res	Res	Res	-----	Res
	Res	Res	Res	Res	Res	Res	-----	Res
	Res	APT2	AP12	AP22	AP32	Res	-----	Res
	Res	APT1	AP11	AP21	AP31	Res	-----	Res
	Res	APT0	AP10	AP20	AP30	Res	-----	Res
	Res	APT0	AP10	AP20	AP30	Res	-----	Res
LSB								

DSF: DIF sequence flag

0 = 10 DIF sequences included in a DIF channel (60-Hz system)

1 = 12 DIF sequences included in a DIF channel (50-Hz system)

APT_n, AP1_n, AP2_n, and AP3_n data shall be identical to the track application IDs (APT_n = 001, AP1_n = 001, AP2_n = 001, AP3_n = 001), if the source signal comes from the DV based digital VCR. If the signal source is unknown, all bits for this data shall be set to 1.

T F: Transmitting flag

TF1: Transmitting flag of audio DIF blocks

TF2: Transmitting flag of VAUX and Video DIF blocks

TF3: Transmitting flag of subcode DIF blocks

0 = Valid data

1 = Invalid data.

Res: Reserved bit for future use

Default value shall be set to 1.

3.4 Subcode section

3.4.1 ID

The ID part of each DIF block in the subcode section shall be the same as described in 3.3.1. The section type shall be 001.

3.4.2 Data

The data part (payload) of each DIF block in the subcode section is shown in figure 4. The subcode data shall consist of 6 SSYBs, each 48 bytes long, and a reserved area of 29 bytes in each relevant DIF block. SSYBs in a DIF sequence are numbered 0 to 11. Each SSYB shall be composed of an SSYB ID equal to 2 bytes, an FF_h , and an SSYB data payload of 5 bytes.

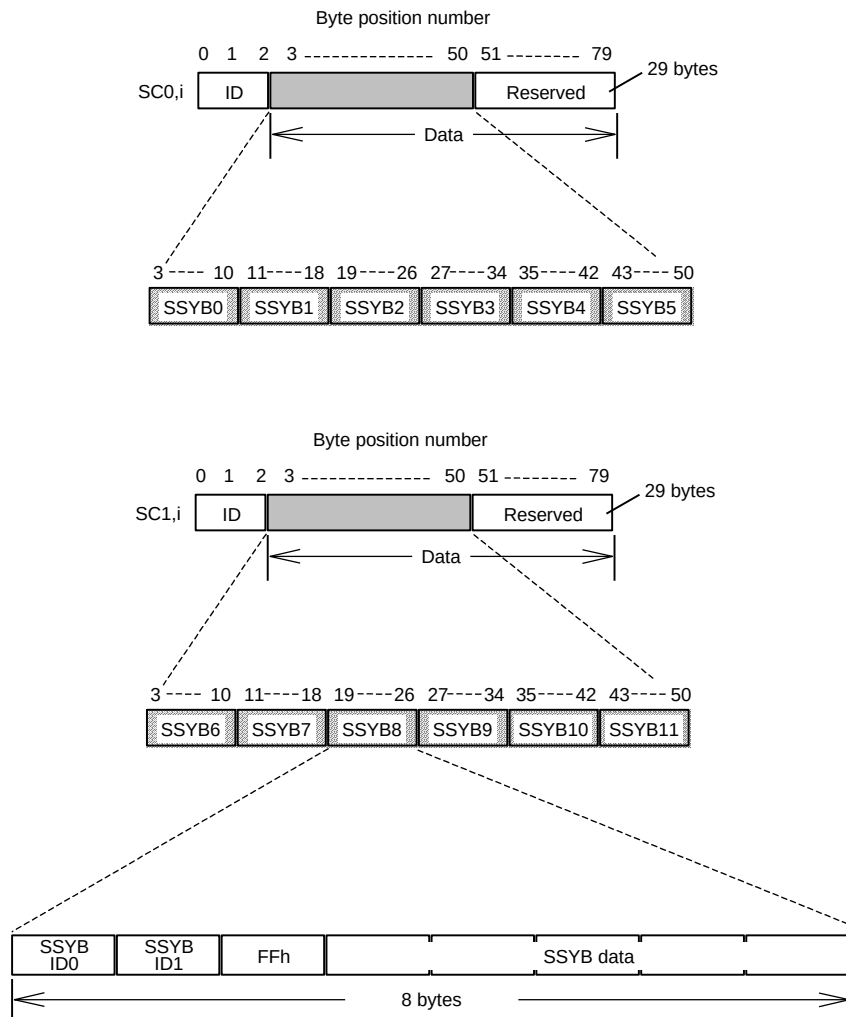


Figure 4 – Data in the subcode section

3.4.2.1 SSYB ID

Table 8 shows the parts of SSYB ID (ID0, ID1). It shall contain FR ID, application ID (AP3₂, AP3₁, AP3₀), (APT₂, APT₁, APT₀), and SSYB number (Syb₃, Syb₂, Syb₁, Syb₀).

Table 8 – SSYB ID

Bit position	SSYB number 0 and 6		SSYB number 1 to 5 and 7 to 10		SSYB number 11	
	ID0	ID1	ID0	ID1	ID0	ID1
b7	FR	Arb	FR	Arb	FR	Arb
b6	AP32	Arb	Res	Arb	APT2	Arb
b5	AP31	Arb	Res	Arb	APT1	Arb
b4	AP30	Arb	Res	Arb	APT0	Arb
b3	Arb	Syb3	Arb	Syb3	Arb	Syb3
b2	Arb	Syb2	Arb	Syb2	Arb	Syb2
b1	Arb	Syb1	Arb	Syb1	Arb	Syb1
b0	Arb	Syb0	Arb	Syb0	Arb	Syb0
NOTE – Arb = arbitrary bit						

FR : The identification for the first half or second half of each DIF channel.
1 = the first half of each DIF channel
0 = the second half of each DIF channel

The first half of each DIF channel
DIF sequence number 0, 1, 2, 3, 4 for 60-Hz system
DIF sequence number 0, 1, 2, 3, 4, 5 for 50-Hz system

The second half of each DIF channel
DIF sequence number 5, 6, 7, 8, 9 for 60-Hz system
DIF sequence number 6, 7, 8, 9, 10, 11 for 50-Hz system

If information is not available, all bits shall be set to 1.

3.4.2.2 SSYB data

Each SSYB data payload shall consist of a pack of 5 bytes as shown in figure 5. Table 9 shows the pack header table (PC0 byte organization). Table 10 shows the pack arrangement in SSYB data for each DIF channel.

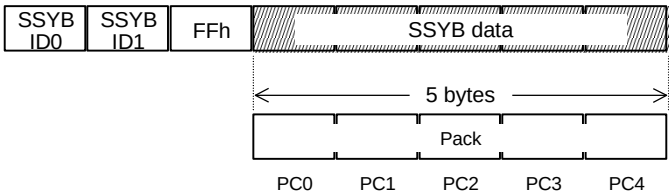


Figure 5 – Pack in SSYB

Table 9 – Pack header table

UPPER LOWER	0000	0001	0010	0011	0100	0101	0110	0111	—	1111
0000						AUDIO SOURCE	VIDEO SOURCE			
0001						AUDIO SOURCE CONTROL	VIDEO SOURCE CONTROL			
0010										
0011		TIME CODE								
0100		BINARY GROUP								
0101										
1111										NO INFO

Table 10 – Mapping of packets in SSYB data

SSYB number	The first half of each DIF channel	The second half of each DIF channel
0	Reserved	Reserved
1	Reserved	Reserved
2	Reserved	Reserved
3	TC	TC
4	BG	Reserved
5	TC	Reserved
6	Reserved	Reserved
7	Reserved	Reserved
8	Reserved	Reserved
9	TC	TC
10	BG	Reserved
11	TC	Reserved
NOTES 1 TC = Time code pack. 2 BG = Binary group pack. 3 Reserved = Default value of all bits shall be set to 1. 4 TC and BG data are the same within each frame. The time code data are an LCT type		

3.4.2.2.1 Time code pack (TC)

Table 11 shows the structure of the time code pack. The time code data mapped to the time code packs shall be the same within each frame.

Table 11 – Structure of time code pack

60-Hz system

MSB					LSB			
PC0	0	0	0	1	0	0	1	1
PC1	CF	DF	TENS of FRAMES		UNITS of FRAMES			
PC2	PC	TENS of SECONDS			UNITS of SECONDS			
PC3	BGF0	TENS of MINUTES			UNITS of MINUTES			
PC4	BGF2	BGF1	TENS of HOURS		UNITS of HOURS			

50-Hz system

MSB					LSB			
PC0	0	0	0	1	0	0	1	1
PC1	CF	Arb	TENS of FRAMES		UNITS of FRAMES			
PC2	BGF0	TENS of SECONDS			UNITS of SECONDS			
PC3	BGF2	TENS of MINUTES			UNITS of MINUTES			
PC4	PC	BGF1	TENS of HOURS		UNITS of HOURS			

NOTE – Detailed information is given in SMPTE 12M.

CF: Color frame

0 = unsynchronized mode

1 = synchronized mode

DF: Drop frame flag

0 = Nondrop frame time code

1 = Drop frame time code

PC: Biphase mark polarity correction

0 = Even

1 = Odd

BGF: Binary group flag

Arb: Arbitrary bit

3.4.2.2.2 Binary group pack (BG)

Table 12 shows the structure of the binary group pack. The binary group data mapped to the binary group packs shall be the same within each frame.

Table 12 – Structure of binary group pack

	MSB				LSB			
PC0	0	0	0	1	0	1	0	0
PC1	BINARY GROUP2				BINARY GROUP1			
PC2	BINARY GROUP4				BINARY GROUP3			
PC3	BINARY GROUP6				BINARY GROUP5			
PC4	BINARY GROUP8				BINARY GROUP7			

3.5 VAUX section

3.5.1 ID

The ID part of each DIF block in the VAUX section shall be the same as described in 3.3.1. The section type shall be 010.

3.5.2 Data

The data part (payload) of each DIF block in the VAUX section is shown in figure 6. This figure shows the VAUX pack arrangement for each DIF sequence.

There shall be 15 packs, each 5 bytes long, and two reserved bytes in each VAUX DIF block payload. A default value for the reserved byte shall be set to FF_h.

Therefore, there are 45 packs in a DIF sequence. The VAUX packs in the DIF blocks are sequentially numbered 0 to 44. This number is called a video pack number.

Table 13 shows the mapping of the VAUX packs of the VAUX DIF blocks. One VAUX source pack (VS) and one VAUX source control pack (VSC) shall exist in each frame. The remaining VAUX packs of the DIF blocks in a DIF sequence are reserved and the value of all reserved words shall be set to FF_h.

If VAUX data are not transmitted, a NO INFO pack, which is filled with FF_h, shall be transmitted.

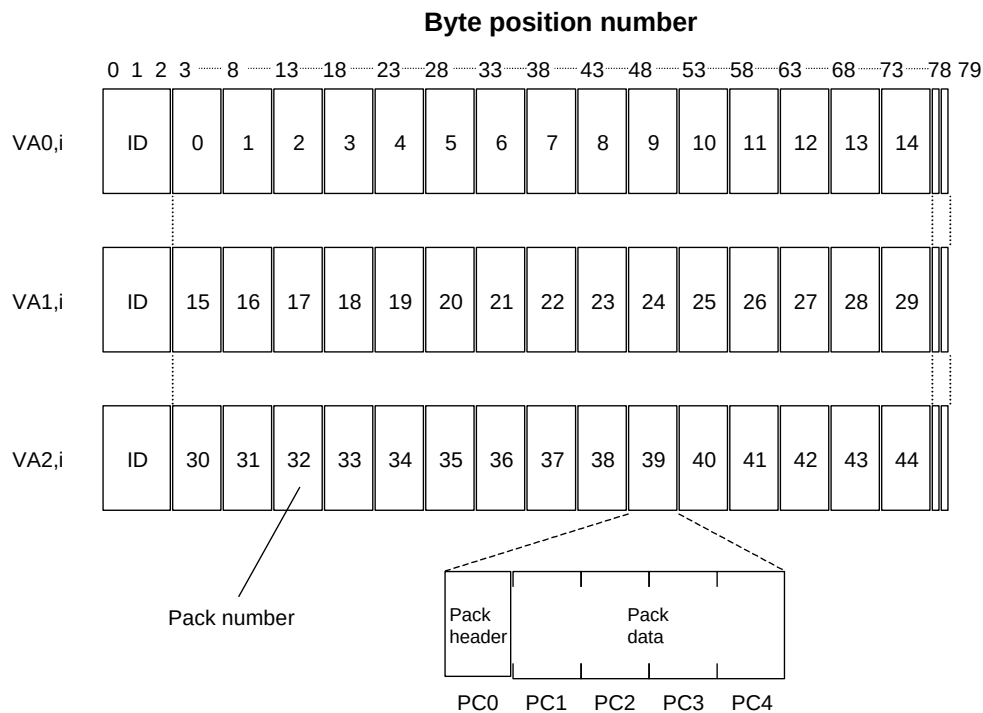


Figure 6 – Data in the VAUX section

Table 13 – Mapping of VAUX pack in a DIF sequence

Pack number		Pack data
Even DIF sequence	Odd DIF sequence	
39	0	VS
40	1	VSC

Even DIF sequence:

DIF sequence number 0, 2, 4, 6, 8 for 60-Hz system

DIF sequence number 0, 2, 4, 6, 8, 10 for 50-Hz system

Odd DIF sequence:

DIF sequence number 1, 3, 5, 7, 9 for 60-Hz system

DIF sequence number 1, 3, 5, 7, 9, 11 for 50-Hz system

3.5.2.1 VAUX source pack (VS)

Table 14 shows the structure of the VAUX source pack.

Table 14 – Structure of VAUX source pack

	MSB					LSB		
PC0	0	1	1	0	0	0	0	0
PC1	Res	Res	Res	Res	Res	Res	Res	Res
PC2	Res	Res	Res	Res	Res	Res	Res	Res
PC3	Res	Res	50/60	STYPE				
PC4	0	Res	Res	Res	Res	Res	Res	Res

50/60:

0 = 60-Hz system

1 = 50-Hz system

STYPE: Video signal type

For 60-Hz system

1 0 1 0 0 b = 1080/60i - 100 Mb/s compression (active line 1080)

1 0 1 0 1 b = 1080/60i - 100 Mb/s compression (active line 1035)

1 1 0 0 0 b = 720/60p - 100 Mb/s compression

Other = Reserved

For 50-Hz system

1 0 1 0 0 b = 1080/50i - 100 Mb/s compression

1 1 0 0 0 b = 720/50p - 100 Mb/s compression

Other = Reserved

Res: Reserved bit for future use

Default value shall be set to 1.

3.5.2.2 VAUX source control pack

Table 15 shows the structure of the VAUX source control pack.

Table 15 – Structure of VAUX source control pack

	MSB					LSB		
PC0	0	1	1	0	0	0	0	1
PC1	CGMS		Res	Res	Res	Res	Res	Res
PC2	Res	Res	0	0	Res	DISP		
PC3	FF	FS	FC	Res	Res	Res	0	0
PC4	Res	Res	Res	Res	Res	Res	Res	Res

CGMS: Copy generation management system

0 0 b = Copy free

Other = Reserved

DISP: Display select mode

0 1 0 b = 16:9

Other = Reserved

FF: Frame/field flag

For the 1080-line system (see table 16)

FF indicates whether two consecutive fields are delivered, or one field is repeated twice during one video frame period (see table 16)

0 = Only one of the two fields is delivered twice

1 = Both fields are delivered in order.

For the 720-line system (see table 17)

FF indicates whether two consecutive video frames are delivered, or one video frame is repeated twice during the two video frames period.

0 = Only one of the two video frames is delivered twice.

1 = Both video frames are delivered in order.

FS: First/second field flag

For the 1080-line system (see table 16)

FS indicates a field which is delivered during the field one period (see table 16)

0 = Field 2 is delivered

1 = Field 1 is delivered.

For the 720-line system (see table 17)

FS indicates a video frame which is delivered during the video frame one period.

0 = Video frame 2 is delivered.

1 = Video frame 1 is delivered.

Table 16 – FF/FS for the 1080-line system

FF	FS	Output field
1	1	Field 1 and field 2 are output in this order (1,2 sequence).
1	0	Field 2 and field 1 are output in this order (2,1 sequence).
0	1	Field 1 is output twice.
0	0	Field 2 is output twice.

Table 17 – FF/FS for the 720-line system

FF	FS	Output video frame
1	1	Video frame 1 and video frame 2 are output in this order (1,2 sequence).
1	0	Video frame 2 and video frame 1 are output in this order (2,1 sequence).
0	1	Video frame 1 is output twice.
0	0	Video frame 2 is output twice.

FC : Frame change flag

For the 1080-line system

FC indicates whether the picture of the current video frame is repeated based on the immediate previous video frame.

0 = Same picture as the previous video frame

1 = Different picture than the previous video frame

For the 720-line system

FC indicates whether the picture of the current two video frames is repeated based on the immediate previous two video frames.

0 = Same picture as the previous two video frames

1 = Different picture than the previous two video frames

Res : Reserved bit for future use

Default value shall be set to 1.

3.6 Audio section

3.6.1 ID

The ID part of each DIF block in the audio section shall be the same as described in 3.3.1. The section type shall be 011.

3.6.2 Data

The data part (payload) of each DIF block in the audio section is shown in figure 7. The data of the DIF block in the audio section shall be composed of 5 bytes of audio auxiliary data (AAUX) and 72 bytes of audio data which is encoded and shuffled by the process as described in 3.6.2.1 and 3.6.2.2.

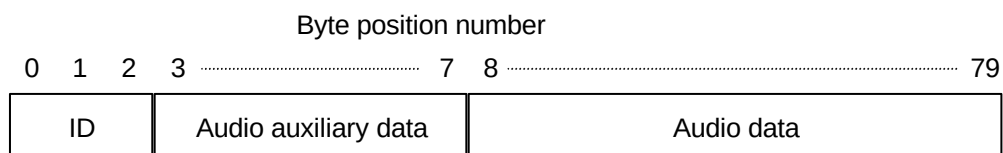


Figure 7 – Data in the audio section

3.6.2.1 Audio encoding

3.6.2.1.1 Source coding

Each audio input signal shall be sampled at 48 kHz, with 16-bit quantization. The system provides eight audio channels. Audio data for each audio channel are located in each respective audio block.

3.6.2.1.2 Emphasis

The audio encoding shall be carried out with the first order pre-emphasis of 50/15 μ s. For the analog input recording, emphasis shall be off in the default state.

3.6.2.1.3 Audio error code

In the encoded audio data, 8000_n shall be assigned as the audio error code to indicate an invalid audio sample. This code corresponds to the negative full scale value in ordinary twos complement representation. When the encoded data includes 8000_n, it shall be converted to 8001_h.

3.6.2.1.4 Relative audio-video timing

1080-line system –

An audio frame shall begin with an audio sample acquired within the duration of minus 50 samples relative to zero samples from the start of line number 1.

720-line system –

An audio frame shall begin with an audio sample acquired within the duration of minus 50 samples relative to zero samples from the start of line number 1 of video frame 1.

3.6.2.1.5 Audio frame processing

The audio data shall be processed in each audio frame. Each audio frame shall contain 1602 or 1600 audio samples for the 60-Hz system or 1920 audio samples for the 50-Hz system for an audio channel with associated status, user, and validity data. For the 60-Hz system, the number of audio samples per audio frame shall follow the five-frame sequence as shown below:

1600, 1602, 1602, 1602, 1602 samples.

One audio frame shall be capable of 1620 samples for the 60-Hz system or 1944 samples for the 50-Hz system. The unused space at the end of each audio frame is filled with arbitrary values.

3.6.2.2 Audio shuffling

The 16-bit audio data word shall be divided into two bytes. The upper byte shall contain MSB, and the lower byte shall contain LSB, as shown in figure 8. Audio data shall be shuffled over DIF sequences and DIF blocks within an audio frame. The data bytes are defined as D_n ($n = 0, 1, 2, \dots$) which is sampled in the n -th order within an audio frame and shuffled by each D_n unit.

The data shall be shuffled through the process as expressed by the following equations:

60-Hz system –

DIF channel number: $i = 0$: Audio CH1,CH2
 $i = 1$: Audio CH3,CH4
 $i = 2$: Audio CH5,CH6
 $i = 3$: Audio CH7,CH8

DIF Sequence number: $(\text{INT}(n/3) + 2 \times (n \bmod 3)) \bmod 5$ for Audio CH1,CH3,CH5,CH7
 $(\text{INT}(n/3) + 2 \times (n \bmod 3)) \bmod 5 + 5$ for Audio CH2,CH4,CH6,CH8

Audio DIF block number: $3 \times (n \bmod 3) + \text{INT}((n \bmod 45) / 15)$

Byte position number: $8 + 2 \times \text{INT}(n/45)$ for the most significant byte
 $9 + 2 \times \text{INT}(n/45)$ for the least significant byte

where $n = 0$ to 1619

50-Hz system –

DIF channel number: $i = 0$: Audio CH1,CH2
 $i = 1$: Audio CH3,CH4
 $i = 2$: Audio CH5,CH6
 $i = 3$: Audio CH7,CH8

DIF Sequence number: $(\text{INT}(n/3) + 2 \times (n \bmod 3)) \bmod 6$ for Audio CH1,CH3,CH5,CH7
 $(\text{INT}(n/3) + 2 \times (n \bmod 3)) \bmod 6 + 6$ for Audio CH2,CH4,CH6,CH8

Audio DIF block number: $3 \times (n \bmod 3) + \text{INT}((n \bmod 54) / 18)$

Byte position number: $8 + 2 \times \text{INT}(n/54)$ for the most significant byte
 $9 + 2 \times \text{INT}(n/54)$ for the least significant byte

where $n = 0$ to 1943

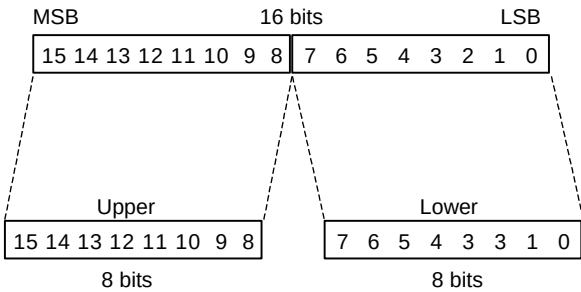


Figure 8 – Conversion of audio sample to audio data bytes

3.6.2.3 Audio auxiliary data (AAUX)

AAUX shall be added to the shuffled audio data as shown in figures 7 and 9. The AAUX pack shall include the AAUX pack header and data (AAUX payload). The length of the AAUX pack shall be 5 bytes as shown in figure 9, which depicts the AAUX pack arrangement. The audio packs are numbered 0 to 8 as shown in figure 9. This number is called an audio pack number.

Table18 shows the structure of the AAUX pack. One AAUX source pack (AS) and one AAUX source control pack (ASC) shall be included in the compressed stream.

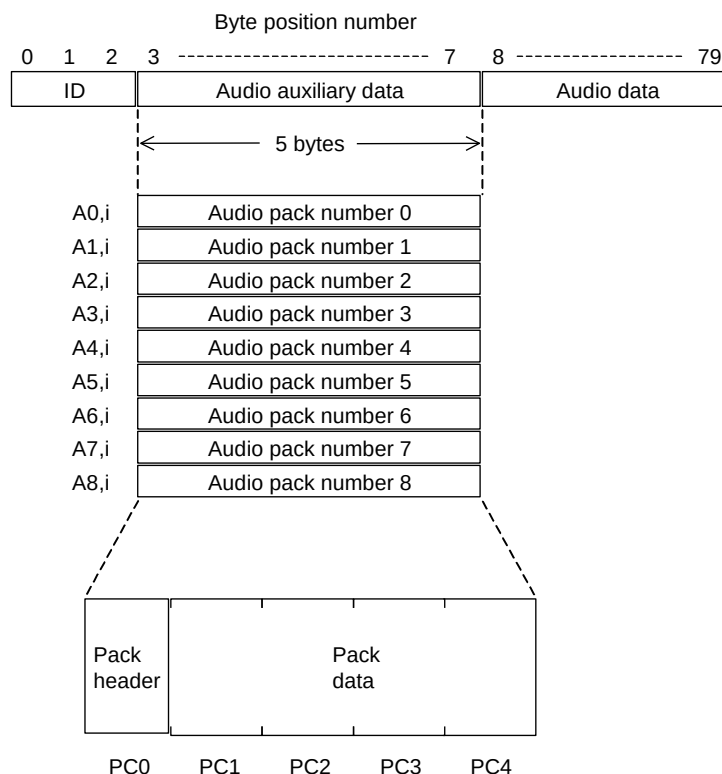


Figure 9 – Arrangement of AAUX packs in audio auxiliary data

Table 18 – Mapping of AAUX pack in a DIF sequence

Audio pack number		Pack data
Even DIF sequence	Odd DIF sequence	
3	0	AS
4	1	ASC

Even DIF sequence :

DIF sequence number 0, 2, 4, 6, 8 for 60-Hz system

DIF sequence number 0, 2, 4, 6, 8, 10 for 50-Hz system

Odd DIF sequence :

DIF sequence number 1, 3, 5, 7, 9 for 60-Hz system

DIF sequence number 1, 3, 5, 7, 9, 11 for 50-Hz system

3.6.2.3.1 AAUX source pack (AS)

The AAUX Source pack shall be configured as shown in table 19.

Table 19 – Structure of AAUX source pack

MSB							LSB	
PC0	0	1	0	1	0	0	0	0
PC1	LF	Res	AF SIZE					
PC2	0	CHN		Res	AUDIO MODE			
PC3	Res	Res	50/60	STYPE				
PC4	Res	Res	SMP			QU		

LF: Locked mode flag

Locking condition of audio sampling frequency with video signal.

0 = Locked mode

1 = Reserved

AF SIZE: The number of audio samples per frame

0 1 0 1 0 0 b = 1600 samples / frame (60-Hz system)

0 1 0 1 1 0 b = 1602 samples / frame (60-Hz system)

0 1 1 0 0 0 b = 1920 samples / frame (50-Hz system)

Other = Reserved

CHN: The number of audio channels within an audio block

0 0 b = One audio channel per an audio block

Other = Reserved

An audio block consists of 45 DIF blocks (9 DIF blocks x 5 DIF sequences) for the 60-Hz system and 54 DIF blocks (9 DIF blocks x 6 DIF sequences) for the 50-Hz system.

AUDIO MODE: The contents of the audio signal on each audio channel

0 0 0 0 b = Audio CH1,CH3,CH5,CH7

0 0 0 1 b = Audio CH2,CH4,CH6,CH8

1 1 1 1 b = Invalid audio data

Other = Reserved

50/60:

0 = 60-Hz system

1 = 50-Hz system

STYPE: Audio blocks for each frame

0 0 0 1 1 b = 8 audio blocks

Other = Reserved

SMP: Sampling frequency

0 0 0 b = 48 kHz

Other = Reserved

QU: Quantization

0 0 0 b = 16 bits linear

Other = Reserved

Res: Reserved bit for future use

Default value shall be set to 1.

3.6.2.3.2 AAUX source control pack (ASC)

The AAUX source control pack shall be configured as shown in table 20.