

RECOMENDACIÓN UIT-R BT.1617

Formato para la transmisión de vídeo comprimida en formato DV, de audio y de datos a través de una interfaz de conformidad con la Recomendación UIT-R BT.1381

(Cuestión UIT-R 12/6)

(2003)

La Asamblea de Radiocomunicaciones de la UIT,

considerando

- a) que existen aplicaciones de producción y posproducción de televisión profesional en las que la compresión de señales de vídeo en formato DV puede ofrecer ventajas de explotación y económicas respecto a las operaciones basadas en la interfaz digital en serie (SDI);
- b) que existe una aplicación basada en la trama de muestreo de 4:2:0 a velocidades de transferencia de datos de 25 Mbit/s, conforme a la Norma CEI 61834-2, conocida como DVCAM;
- c) que los elementos de audio, datos y vídeo comprimido de los sistemas en formato DV llevan un formato diferente del de los sistemas basados en formato DV;
- d) que se optimiza el formato para la interconexión entre magnetoscopios de formato DV y sistemas de disco;
- e) que las velocidades de transferencia pueden ser de hasta cinco veces superiores a las de tiempo real;
- f) que se están desarrollando actualmente decodificadores múltiples a fin de incorporar los trenes de datos basados en DVCAM en la producción basada en formato DV,

recomienda

1 que para las aplicaciones de producción y posproducción de televisión profesional que utilizan la compresión en formato DV, se utilicen los parámetros indicados en la Norma SMPTE 322M-1999, «Format for Transmission of DV Compressed Video, Audio and Data Over a Serial Data Transport Interface».

Resumen de la Norma SMPTE 322M-1999

Esta Norma especifica la estructura de los datos y el formato para la transmisión de señales de vídeo comprimidas, en formato DV de audio y de datos a través de una interfaz de transporte de datos en serie (SDTI), que se define en la Recomendación UIT-R BT.1381 y en la Norma SMPTE 305M. La Norma es una combinación de datos de vídeo, de audio, de subcódigos y de control optimizada para realizar la conexión entre magnetoscopios de formato DV y sistemas de disco. Permite la transferencia de trenes de datos de alta velocidad, a velocidades hasta cinco veces superiores a las de tiempo real. Los datos de vídeo, de audio y de subcódigo cumplen con la Norma CEI 61834-2, tanto para los sistemas 525/60 como para los sistemas 625/50. Los trenes binarios están compuestos de bloques de datos DIF de 77 octetos, que son comunes a otras señales basadas en el formato DV. Se efectúa una transferencia de los bloques de interfaz digital DIF hacia la SDTI mediante un algoritmo limitado por la trama a fin de preservar la facilidad de manipulación de los datos de vídeo y de audio.

NOTA 1 – La Norma SMPTE 322M-1999 figura en el Anexo 1 y la Norma 305M puede encontrarse en: <http://ties.itu.int/u/itu-r/ede/rsg6/SMPTE/>. La Norma SMPTE 322M-1999 y su resumen se refiere únicamente a la versión 1999, que es la aprobada por las Administraciones de los Estados Miembros de la UIT el 03-05-03 en cumplimiento de lo dispuesto en la Resolución UIT-R 1-3. En virtud del acuerdo entre la UIT y la SMPTE, la SMPTE ha facilitado y autorizado la utilización de esta versión y el UIT-R ha aceptado su inclusión en la presente Recomendación. Cualquier versión posterior de la Norma SMPTE 322M que no haya sido aceptada y aprobada por la Comisión de Estudio 6 de Radiocomunicaciones no formará parte de la presente Recomendación. Las últimas versiones de los documentos de la SMPTE se pueden consultar en el sitio web de la SMPTE: <http://www.smpite.org/>.

SM PTE 322M -1999

SM PTE STANDARD

for Television — Form at for Transm ission of DV Com pressed V ideo, Audib and Data O vera Serial Data Transport Interface



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1 Scope

This standard specifies the data structure and the transm ission form at of DV com pressed video, audib, and data over a serial data transport interface (SDTI [SM PTE 305M]). The standard is a com bination of video, audib, subcode, and control data optin ized for the connection between DV-com pliant VCR s and disk system s. It ensures high-speed data stream transfer up to five times faster than real time. The video, audib, and subcode data com ply with IEC 61834-2 for both 525/60 and 625/50 system s. The bitstream consists of 77-byte DIF data bblcks, which are com m on to other DV based signal s. The DIF bblcks are m apped onto SDTI using a fram e-bounded algorithm preserving ease of m anipulating the video and audib data.

The layers of signal processing and related standards are shown in figure 1.

NOTE — For descriptions of the SDTI, refer to SM PTE 305M , and for descriptions of video, audib, and subcode data, refer to IEC 61834-2. The standard corresponds to data type [241_h] registered as DVCAM -1 in SM PTE 305M .

2 Norm ative references

The folloing standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. 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 edition of the standards indicated below.

SM PTE 305M -1998, Television — Serial Data Transport Interface

IEC 61834-2 (1998-08), 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 System s) — Part 2: SD Form at for 525-60 and 625-50 System s

3 SDTHeaderdata

The SDTHeaderdata as specified in SM PTE 305M shall contain the param eters shown in table 1, and shall be repeated on every line. The SDTHeaderdata structure is as shown in figure 2.

4 Data structure

The folloing clause describes the basic data structure and the system param eters of the bitstream. The data structure of the SDTI paylad is shown in figure 3. The data bblck consists of a control data bblck and five vertical data sbts, in which one com pressed video stream shall be contained. The empty space and reserved area shall be set to all zeros (200_h) as default value.

4.1 Data bblck

The control data bblck and the DIF data shall be contained in B0 (LSB) through B7 (8 bits). B8 shall be a reserved data bit for future expansion, which is normally set to zero. B9 shall be the complement of B8.

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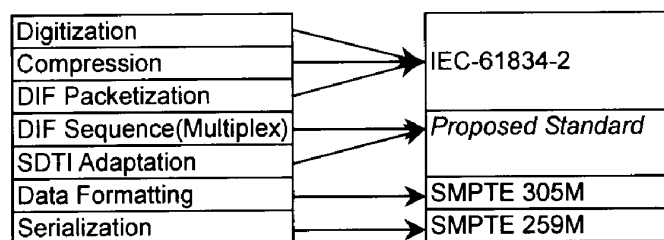
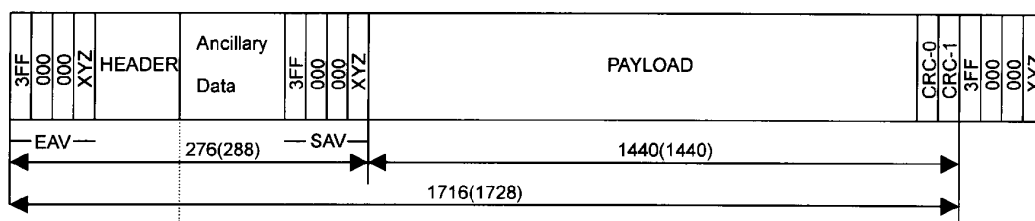


Figure 1 –Layers of signal processing and related standards

Table 1 –Header data packet

Parameters	Length	Value
ADF	3 words	[000h][3FFh][3FFh]
DID	1 word	[140h]
SDID	1 word	[101h]
DC	1 word	[22Eh]
Line number	2 words	—
Line numberCRC	2 words	—
Code	4 bits	[1h]
AAI	4 bits	—
Destination address	16 words	—
Source address	16 words	—
Block type	1 word	[1C1h]
CRC flag	1 word	[101h]
Data extension flag	1 word	[200h]
Reserved data	4 words	[200h][200h][200h][200h]
HeaderCRC	2 words	—
CS	1 word	—



The figure in () is for 625 Line System

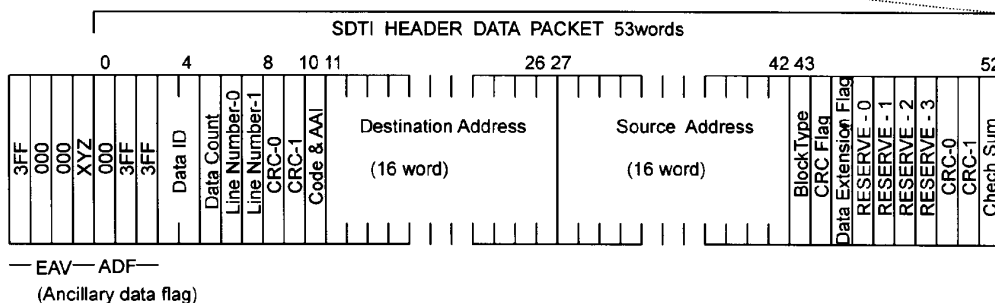


Figure 2 –SDTI header data structure

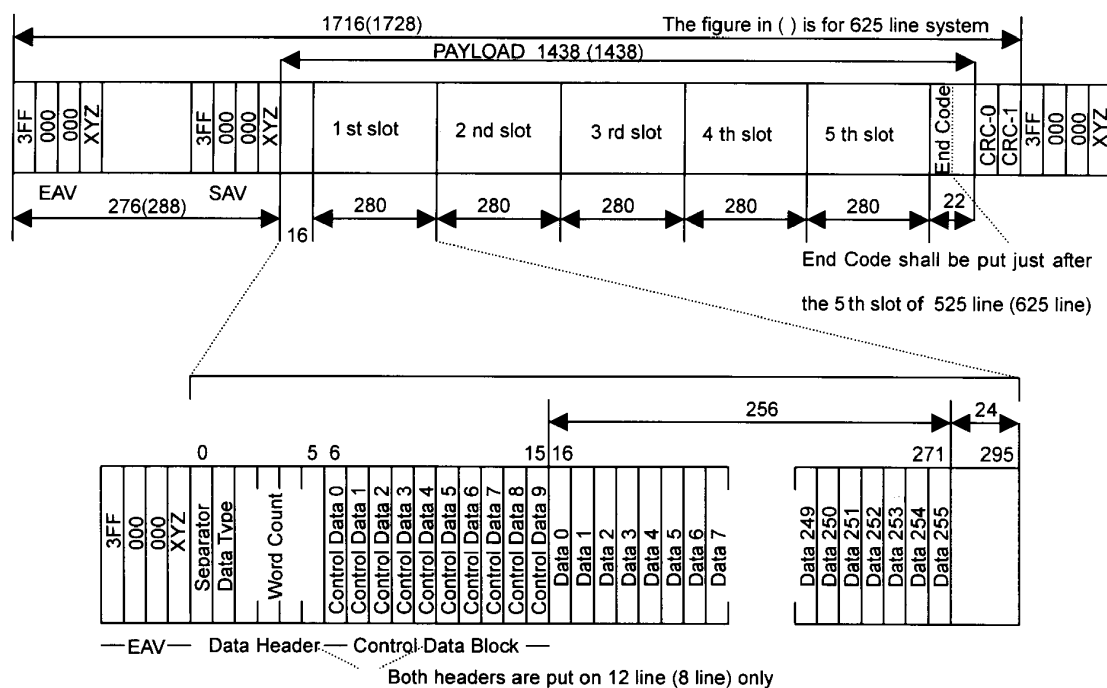


Figure 3 -Data structure

4.2 Data block header

The data block header, as specified in SMPTE 305M, shall contain the parameters shown in table 2. The data block header shall exist on line 12 for the 525/60 system or line 8 for the 625/50 system (refer to figures 4 and 7).

Table 2 -Data block header

Parameters	Length	Value
Separator	1 word	[309 _h]
Data type	1 word	[241 _h]
Word count	4 words	[B4720 _h] (525/60 system) [D8F50 _h] (625/50 system)

4.3 Control data block

Followed by the data block header, a control data block shall be inserted (immediately after the SDTI data block header). The control data block shall consist of 10 words (see figure 2), and the bits are allocated as shown in table 3. The control data block has some areas of commonality with the header section specified in EEC 61834-2, and also provides

specific data required for data transfer between storage devices.

Byte 1: Indicates the data type (secondary).

Byte 2: Indicates the transfer conditions (transfer speed, locked/unlocked, audio and video validity).

Bytes 3-10: Common information to EEC 61834-2.

4.3.1 Secondary data type

The control data block and the data slots are preceded with a secondary data type (1 word), with which the entire data block is defined. The initial code shall be set to all zero, and the receiver shall attempt to decode the data as soon as the desired secondary data type is detected.

Value	Description
0000 0000	Initial code
0000 0001	Data block as defined
0000 0010	Reserved
1111 1111	

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Table 3 –Control data block structure

MSB								LSB	
Byte 1	Secondary data type								
Byte 2	0 0 (RESERVE)		VIDEO INVALID	AUDIO INVALID	LOCK	TRANSFER MODE			
Byte 3	V 50/60	V STYPE	A 50/60	A STYPE	AP3	AP2	AP1	APT	
Byte 4	FF	FS	V REC MODE	BCSYS		DISP			
Byte 5	A-1 LF	A-1 CHN		A-1 PA	A-1 AUDIO MODE				
Byte 6	A-1 REC ST	A-1 REC END	A-1 REC MODE	A-1 EF	A-1 SMP		A-1 QU		
Byte 7	A-1 DRF	A-1 SPEED							
Byte 8	A-2 LF	A-2 CHN		A-2 PA	A-2 AUDIO MODE				
Byte 9	A-2 REC ST	A-2 REC END	A-2 REC MODE	A-2 EF	A-2 SMP		A-2 QU		
Byte 10	A-2 DRF	A-2 SPEED							

4.3.2 Transfer mode

The transfer mode specifies the desired transfer speed of the compressed video stream. The following transfer speed can be selected:

Value	Description
000	Reserved
001	Normal speed (1X)
010	2X speed
011	3X speed
100	4X speed
101	5X speed
110	Reserved
111	Reserved

LOCK: Indicates whether the VCR is being servo locked or not during the data transfer.

Value	Description
0	VCR servo unlocked
1	VCR servo locked

AUDIO INVALID: Indicates the validity of the audio data. When the AUDIO INVALID flag is active (1), the receiver shall not attempt to decode the audio data.

Value	Description
0	Audio data valid
1	Audio data invalid

VIDEO INVALID: Indicates the validity of the video data. When the VIDEO INVALID flag is active (1), the receiver shall not attempt to decode the video data.

Value	Description
0	Video data valid
1	Video data invalid

4.3.6 Common parameters

Other parameters contained in bytes 3 to 10 are common information to the international standard (IEC 61834).

4.4 Data slot

Each data slot consists of 280 words, and shall start from the word number address shown below. The data shall be contained in the first 256 bytes, and the last 24 bytes are reserved for future extensions.

Word address	Number
Slot 1	16
Slot 2	296
Slot 3	576
Slot 4	856
Slot 5	1136

4.5 Endcode

The endcode as specified in SM PTE 305M shall be present at the word number address 1416 on line 525 for the 525/60 system, or line 625 for the 625/50 system.

Parameters	Length	Value
Encode	1 word	[30A _n]

5 Transmission Format

The following clause describes the overall transmission format and the detailed data structure of the compressed video stream.

5.1 Digital interface format (DIF)

The data structure of the video, audio, and subcode in the DIF blocks shall be as specified in EEC 61834-2. However, the 3-byte ID shall not be carried over the interface (see figures 4, 5, and 6). The DIF blocks shall be mapped onto the data slots using a frame-bounded algorithm, which is different in sequence from the one specified in EEC 61834-2.

5.2 525/60 system

The data block shall be transmitted from line 12 through line 525, provided that valid data shall not exist on lines 9-11 and 272-274 for the 525/60 system as shown in figure 7. The areas in lines 247-271 and 510-8 are reserved for future extensions.

5.2.1 Video sections

The video sections are contained in lines 12-223 and 275-486 (see figure 8):

(n, V0) – (n, V134); n = 0 to 9

5.2.2 SC/VAUX sections

The SC/VAUX sections are contained in lines 224-231 and 487-494 (see figure 9):

(n, SC0), (n, SC1), (n, VA0), (n, VA1), (n, VA2);
n = 0 to 9

5.2.3 Audio/AAUX sections

The audio/AAUX sections are contained in lines 232-246 and 495-509 (see figure 9):

(n, A0) – (n, A8); n = 0 to 9

5.3 625/50 system

The data block shall be transmitted from line 8 through line 625, provided that valid data shall not exist on lines 5-7 and 318-320 for the 625/50 system as shown in figure 10. The areas in lines 289-317 and 602-4 are reserved for future extensions.

5.3.1 Video sections

The video sections are contained in lines 8-261 and 321-574 (see figure 11):

(n, V0) – (n, V134); n = 0 to 11

5.3.2 SC/VAUX sections

The SC/VAUX sections are contained in lines 262-271 and 575-584 (see figure 12):

(n, SC0), (n, SC1), (n, VA0), (n, VA1), (n, VA2);
n = 0 to 11

5.3.3 Audio/AAUX sections

The audio/AAUX sections are contained in lines 272-288 and 585-601 (see figure 12):

(n, A0) – (n, A8); n = 0 to 11

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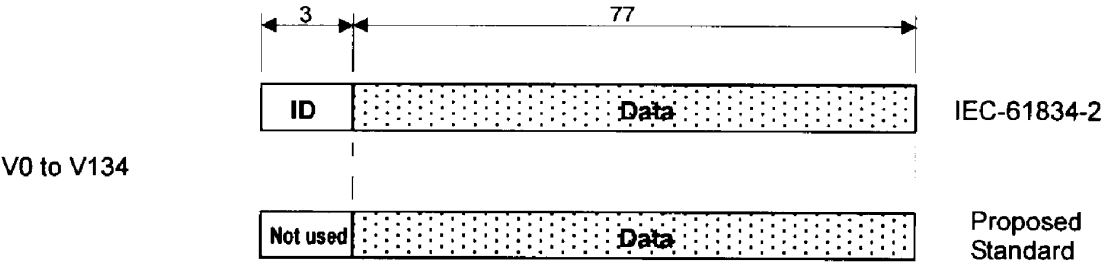


Figure 4 –Data in the video sections

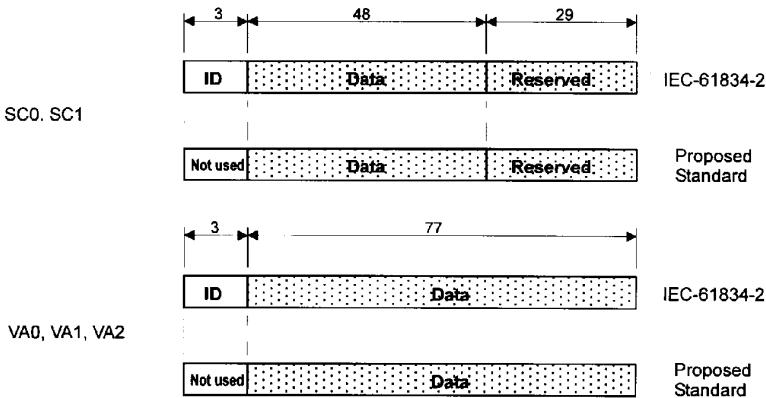


Figure 5 –Data in the SC /VAUX sections

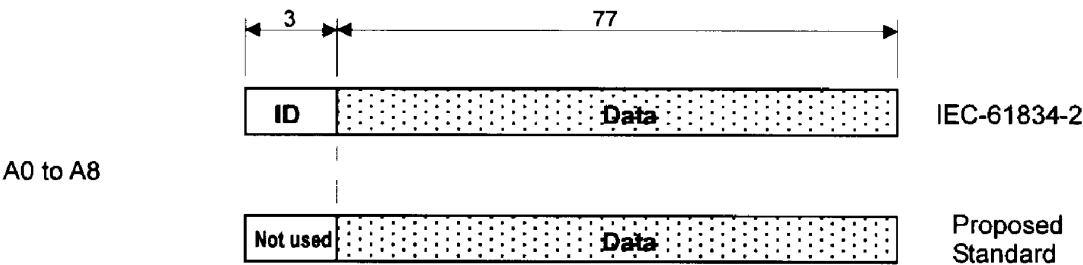


Figure 6 –Data in the audio/AAUX sections

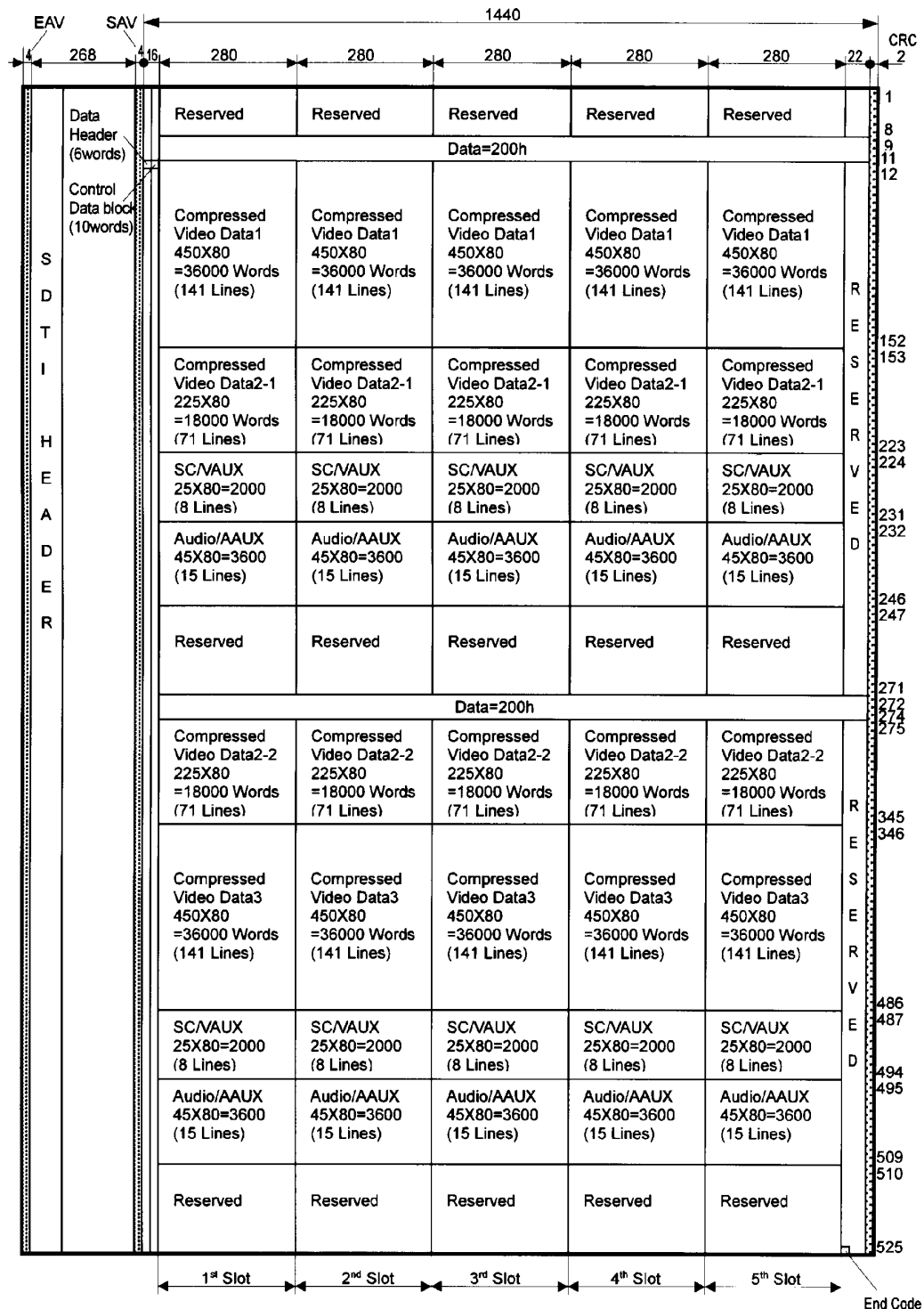


Figure 7 –Transmission form at for 525/60 system

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		280					
Line Number		256				24	
12		(0, V0)	(0, V1)	(0, V2)	(0, V3)	R E S E R V E D	
13		(0, V3)	(0, V4)	(0, V5)	(0, V6)		
14		(0, V6)	(0, V7)	(0, V8)	(0, V9)		
54		(0, V131)	(0, V132)	(0, V133)	(0, V134)		
55		(0, V134)	(1, V0)	(1, V1)	(1, V2)		
56		(1, V2)	(1, V3)	(1, V4)	(1, V5)		
96		(1, V130)	(1, V131)	(1, V132)	(1, V133)		
97		(1, V133)	(1, V134)	(2, V0)	(2, V1)		
98		(2, V2)	(2, V3)	(2, V4)	(2, V5)		
138		(2, V130)	(2, V131)	(2, V132)	(2, V133)		
139		(2, V133)	(2, V134)	(3, V0)	(3, V1)		
140		(3, V1)	(3, V2)	(3, V3)	(3, V4)		
151		(3, V39)	(3, V40)	(3, V41)	(3, V42)		
152		(3, V43)	(3, V44)	Invalid Data(96words)			
153		(3, V45)	(3, V46)	(3, V47)	(3, V48)		
180		(3, V131)	(3, V132)	(3, V133)	(3, V134)		
181		(3, V134)	(4, V0)	(4, V1)	(4, V2)		
182		(4, V2)	(4, V3)	(4, V4)	(4, V5)		
222		(4, V130)	(4, V131)	(4, V132)	(4, V133)		
223		(4, V134)	Invalid Data(176words)				
275		(5, V0)	(5, V1)	(5, V2)	(5, V3)	R E S E R V E D	
276		(5, V3)	(5, V4)	(5, V5)	(5, V6)		
277		(5, V6)	(5, V7)	(5, V8)	(5, V9)		
316		(5, V131)	(5, V132)	(5, V133)	(5, V134)		
317		(5, V134)	(6, V0)	(6, V1)	(6, V2)		
318		(6, V2)	(6, V3)	(6, V4)	(6, V5)		
344		(6, V85)	(6, V86)	(6, V87)	(6, V88)		
345		(6, V89)	Invalid Data(176words)				
346		(6, V90)	(6, V91)	(6, V92)	(6, V93)		
359		(6, V131)	(6, V132)	(6, V133)	(6, V134)		
360		(6, V134)	(7, V0)	(7, V1)	(7, V2)		
361		(7, V3)	(7, V4)	(7, V5)	(7, V6)		
401		(7, V131)	(7, V132)	(7, V133)	(7, V134)		
402		(7, V134)	(8, V0)	(8, V1)	(8, V2)		
403		(8, V2)	(8, V3)	(8, V4)	(8, V5)		
443		(8, V130)	(8, V131)	(8, V132)	(8, V133)		
444		(8, V133)	(8, V134)	(9, V0)	(9, V1)		
445		(9, V1)	(9, V2)	(9, V3)	(9, V4)		
485		(9, V129)	(9, V130)	(9, V131)	(9, V132)		
486		(9, V133)	(9, V134)	Invalid Data(96words)			

Figure 8 –Video sections for 525/60 system

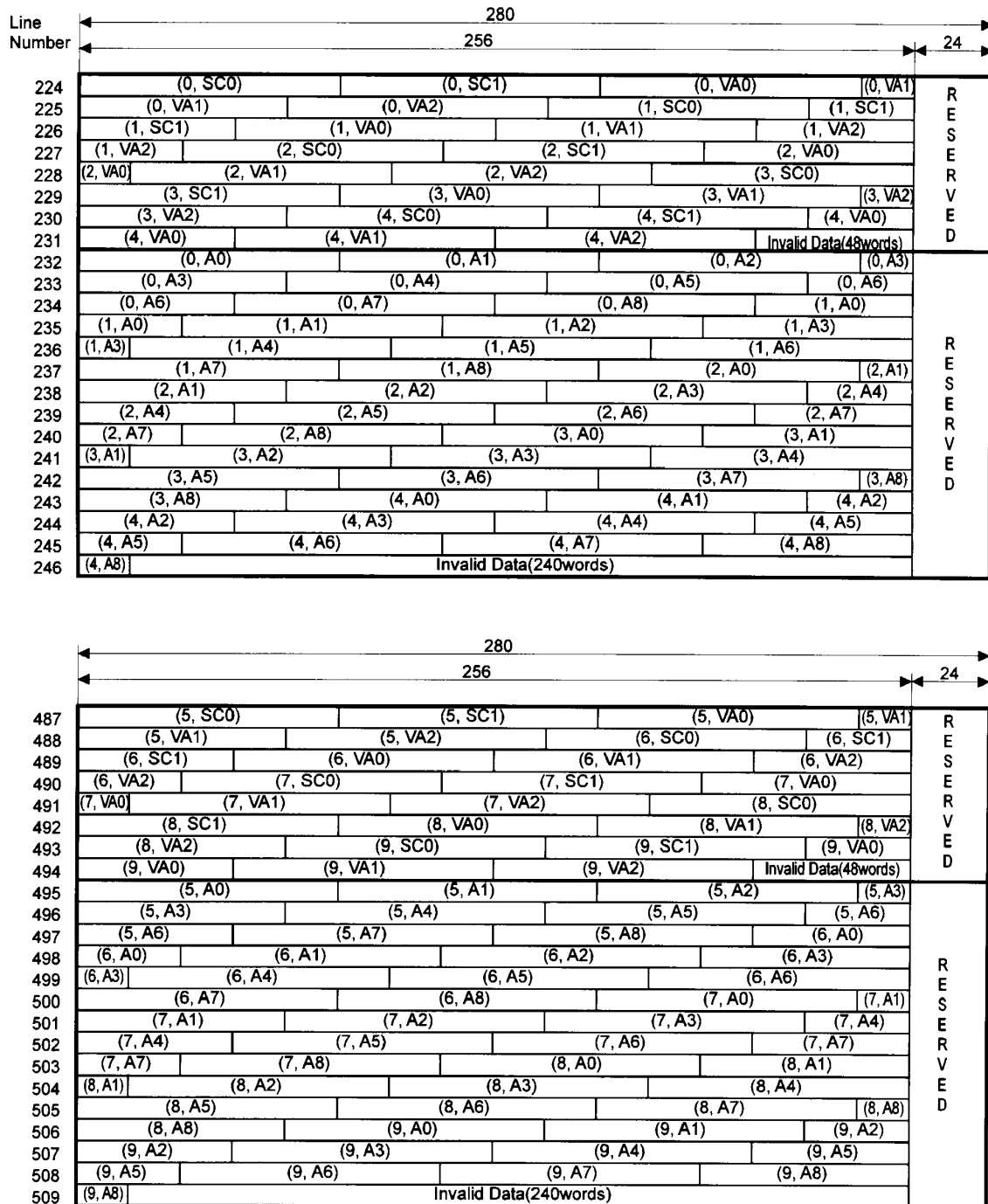


Figure 9 –SC/VAUX and audio/AUX sections for 525/60 system

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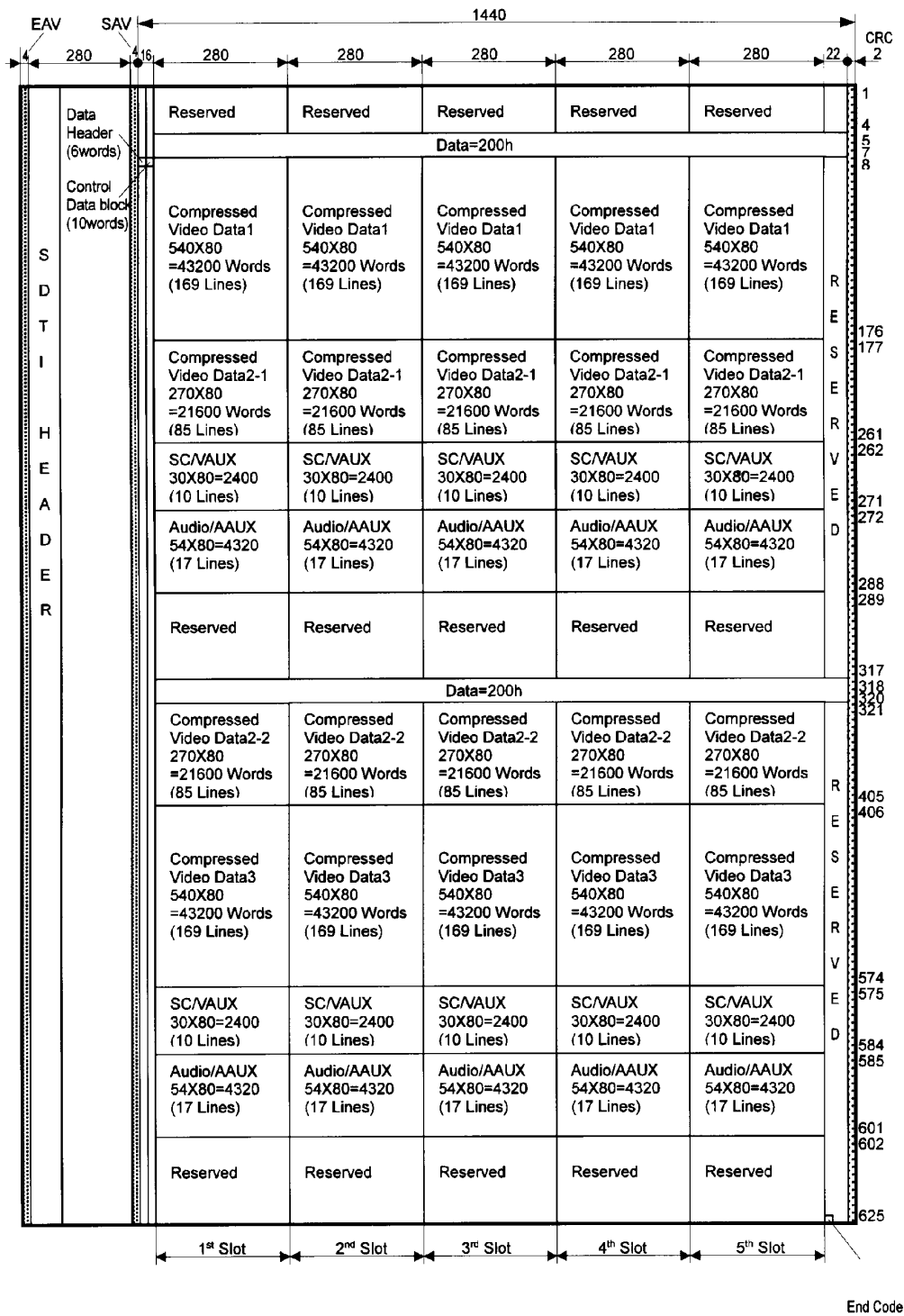


Figure 10 –Transmission format for 625/50 system

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Line Number	280				256				24			
8	(0, V0)				(0, V1)				(0, V2)			
9	(0, V3)				(0, V4)				(0, V5)			
10	(0, V6)				(0, V7)				(0, V8)			
49	(0, V131)				(0, V132)				(0, V133)			
50	(0, V134)				(1, V0)				(1, V1)			
51	(1, V2)				(1, V3)				(1, V4)			
91	(1, V130)				(1, V131)				(1, V132)			
92	(1, V133)				(1, V134)				(2, V0)			
93	(2, V2)				(2, V3)				(2, V4)			
133	(2, V130)				(2, V131)				(2, V132)			
134	(2, V133)				(2, V134)				(3, V0)			
135	(3, V1)				(3, V2)				(3, V3)			
175	(3, V129)				(3, V130)				(3, V131)			
176	(3, V132)				(3, V133)				(3, V134)			
177	(4, V0)				(4, V1)				(4, V2)			
218	(4, V131)				(4, V132)				(4, V133)			
219	(4, V134)				(5, V0)				(5, V1)			
220	(5, V2)				(5, V3)				(5, V4)			
260	(5, V130)				(5, V131)				(5, V132)			
261	(5, V133)				(5, V134)				Invalid Data(160words)			
321	(6, V0)				(6, V1)				(6, V2)			
322	(6, V3)				(6, V4)				(6, V5)			
323	(6, V6)				(6, V7)				(6, V8)			
362	(6, V131)				(6, V132)				(6, V133)			
363	(6, V134)				(7, V0)				(7, V1)			
364	(7, V2)				(7, V3)				(7, V4)			
404	(7, V130)				(7, V131)				(7, V132)			
405	(7, V133)				(7, V134)				Invalid Data(160words)			
406	(8, V0)				(8, V1)				(8, V2)			
447	(7, V131)				(8, V132)				(8, V133)			
448	(8, V134)				(9, V0)				(9, V1)			
449	(9, V2)				(9, V3)				(9, V4)			
489	(9, V131)				(9, V132)				(9, V133)			
490	(9, V134)				(10, V0)				(10, V1)			
491	(10, V3)				(10, V4)				(10, V5)			
531	(10, V130)				(10, V131)				(10, V132)			
532	(10, V133)				(10, V134)				(11, V0)			
533	(11, V1)				(11, V2)				(11, V3)			
573	(11, V129)				(11, V130)				(11, V131)			
574	(11, V132)				(11, V133)				(11, V134)			
									Invalid Data(64words)			

Figure 11 –Video sections for 625/50 system

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Line Number	280				256				24			
262	(0, SC0)				(0, SC1)				(0, VA0)			
263	(0, VA1)				(0, VA2)				(1, SC0)			
264	(1, SC1)				(1, VA0)				(1, VA1)			
265	(1, VA2)				(2, SC0)				(2, SC1)			
266	(2, VA0)				(2, VA1)				(2, VA2)			
267	(3, SC1)				(3, VA0)				(3, VA1)			
268	(3, VA2)				(4, SC0)				(4, SC1)			
269	(4, VA0)				(4, VA1)				(4, VA2)			
270	(5, SC0)				(5, SC1)				(5, VA0)			
271	(5, VA1)				(5, VA2)				Invalid Data(160words)			
272	(0, A0)				(0, A1)				(0, A2)			
273	(0, A3)				(0, A4)				(0, A5)			
274	(0, A6)				(0, A7)				(0, A8)			
275	(1, A0)				(1, A1)				(1, A2)			
276	(1, A3)				(1, A4)				(1, A5)			
277	(1, A7)				(1, A8)				(2, A0)			
278	(2, A1)				(2, A2)				(2, A3)			
279	(2, A4)				(2, A5)				(2, A6)			
280	(2, A7)				(2, A8)				(3, A0)			
281	(3, A1)				(3, A2)				(3, A3)			
282	(3, A5)				(3, A6)				(3, A7)			
283	(3, A8)				(4, A0)				(4, A1)			
284	(4, A2)				(4, A3)				(4, A4)			
285	(4, A5)				(4, A6)				(4, A7)			
286	(4, A8)				(5, A0)				(5, A1)			
287	(5, A3)				(5, A4)				(5, A5)			
288	(5, A6)				(5, A7)				(5, A8)			
575	(6, SC0)				(6, SC1)				(6, VA0)			
576	(6, VA1)				(6, VA2)				(7, SC0)			
577	(7, SC1)				(7, VA0)				(7, VA1)			
578	(7, VA2)				(8, SC0)				(8, SC1)			
579	(8, VA0)				(8, VA1)				(8, VA2)			
580	(9, SC1)				(9, VA0)				(9, VA1)			
581	(9, VA2)				(10, SC0)				(10, SC1)			
582	(10, VA0)				(10, VA1)				(10, VA2)			
583	(11, SC0)				(11, SC1)				(11, VA0)			
584	(11, VA1)				(11, VA2)				Invalid Data(160words)			
585	(6, A0)				(6, A1)				(6, A2)			
586	(6, A3)				(6, A4)				(6, A5)			
587	(6, A6)				(6, A7)				(6, A8)			
588	(7, A0)				(7, A1)				(7, A2)			
589	(7, A3)				(7, A4)				(7, A5)			
590	(7, A7)				(7, A8)				(8, A0)			
591	(8, A1)				(8, A2)				(8, A3)			
592	(8, A4)				(8, A5)				(8, A6)			
593	(8, A7)				(8, A8)				(9, A0)			
594	(9, A1)				(9, A2)				(9, A3)			
595	(9, A5)				(9, A6)				(9, A7)			
596	(9, A8)				(10, A0)				(10, A1)			
597	(10, A2)				(10, A3)				(10, A4)			
598	(10, A5)				(10, A6)				(10, A7)			
599	(10, A8)				(11, A0)				(11, A1)			
600	(11, A3)				(11, A4)				(11, A5)			
601	(11, A6)				(11, A7)				(11, A8)			

Figure 12 –SC/VAUX and audib/AUX sections for 625/50 system

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Annex A (informative)

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