

## RECOMMANDATION UIT-R BT.1617

**Format de la transmission de signaux vidéo compressés  
au format vidéonumérique, de signaux audio et de données  
via des interfaces conformes à la Recommandation UIT-R BT.1381**

(Question UIT-R 12/6)

(2003)

L'Assemblée des radiocommunications de l'UIT,

*considérant*

- a) que, dans certaines applications de la production et la postproduction de télévision professionnelle, on a constaté que la compression vidéo conforme vidéonumérique pouvait offrir des avantages économiques et d'exploitation lorsqu'elle était utilisée dans des opérations utilisant l'interface série numérique;
- b) qu'il existe une application, appelée DVCAM, utilisant une grille d'échantillonnage 4:2:0 et un débit de 25 Mbit/s conforme à la norme CEI 61834-2;
- c) que le formatage des éléments audio, de données et de vidéo compressée des systèmes conformes à la norme vidéonumérique est différent de ceux des systèmes utilisant la norme vidéonumérique;
- d) que le formatage est optimisé pour l'interconnexion de magnétoscopes conformes à la norme vidéonumérique avec des systèmes à disque;
- e) que l'on peut obtenir des vitesses de transfert jusqu'à cinq fois plus rapides qu'en temps réel;
- f) que des décodeurs agiles destinés à intégrer des flux de données DVCAM dans des productions vidéonumériques sont en cours de développement,

*recommande*

**1** d'utiliser, pour les applications de la production et de la postproduction de télévision professionnelle utilisant la compression vidéonumérique, les paramètres proposés dans la norme SMPTE 322M-1999 «Format for Transmission of DV Compressed Video, Audio and Data over a Serial data Transport Interface».

**Résumé de la norme SMPTE 322M-1999**

Cette norme spécifie la structure de données et le format de transmission des signaux de vidéo compressée, audio et de données via une interface de transport de données série conforme à la Recommandation UIT-R BT.1381 et à la norme SMPTE 305M. Elle est une combinaison de données vidéo, audio, de sous-code et de commande optimisée pour la connexion entre magnétoscopes conformes vidéonumériques et systèmes à disque. Elle produit un flux de données rapide, jusqu'à cinq fois plus rapide qu'en temps réel. Les données vidéo, audio et de code secondaire sont conformes à la norme CEI 61834-2 tant pour les systèmes 525/60 que 625/50. Le flux est constitué de blocs de données d'interface numérique DIF à 77 octets, qui sont également utilisés par d'autres signaux à compression vidéonumérique. Les blocs d'interface numérique sont mappés sur des interfaces de transport de données série au moyen d'un algorithme lié à la trame préservant la simplicité de manipulation des données vidéo et audio.

NOTE 1 – La norme SMPTE 322M-1999 est donnée dans l'Annexe 1 et la norme 305M est disponible sur le site suivant: <http://ties.itu.int/u/itu-r/ede/rsg6/SMPTE/>. La norme SMPTE 322M-1999 et son résumé renvoient uniquement à la version 1999, qui est celle qui a été approuvée, en application de la Résolution UIT-R 1-3, le 03-05-03, par les Administrations des Etats Membres de l'UIT. Comme convenu entre l'UIT et la SMPTE, ladite version a été fournie par la SMPTE qui en a autorisé l'utilisation et l'UIT-R a accepté de l'inclure dans la présente Recommandation. Toute version ultérieure de la norme SMPTE 322M, qui n'aurait pas été agréée et approuvée par la Commission d'études 6 des radiocommunications, n'entre pas dans le cadre de la présente Recommandation. Pour des versions ultérieures de documents SMPTE, le lecteur est prié de consulter le site web de la SMPTE à l'adresse suivante: <http://www.smpete.org/>.

---

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



Page 1 of 13 pages

Table of contents

- 1 Scope
- 2 Norm ative references
- 3 SDTHeaderdata
- 4 Data structure
- 5 Transm ission form at

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 VCRs and disk system s. It ensures high-speed data stream transfer up to five tin es faster than real tin e. The video, audib, and subcode data com ply w ith EC 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.

NO TE —For descriptions of the SDTI, refer to SM PTE 305M , and for descriptions of video, audib, and subcode data, refer to EC 61834-2. The standard corresponds to data type [241<sub>h</sub>] registered as DVCAM -1 in SM PTE 305M .

2 Norm ative references

The folw ing standards contain provisions which, through reference in this text, constitute provisions of this standard. At the tin e of publication, the editions indicated were valid. All standards are subject to

revision, and parties to agreem ents based on this standard are encouraged to investigate the possibility of applying the m ost recent edition of the standards indicated below .

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

EC 61834-2 (1998-08), Recording — Helical Scan Digital Video Cassette Recording System Using 6,35 mm M agnetic 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 folw ing clause describes the basic data structure and the system param eters of the bitstream . The data structure of the SDTI pay load is shown in figure 3. The data bblck consists of a control data bblck and five vertical data slots, in which one com pressed video stream shall be contained. The empty space and reserved area shall be set to all zeros (200<sub>h</sub>) 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 com plem ent of B8.

SM PTE 322M -1999

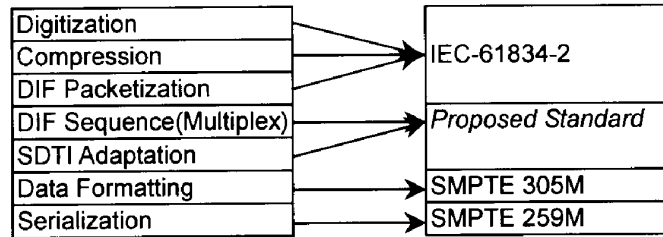
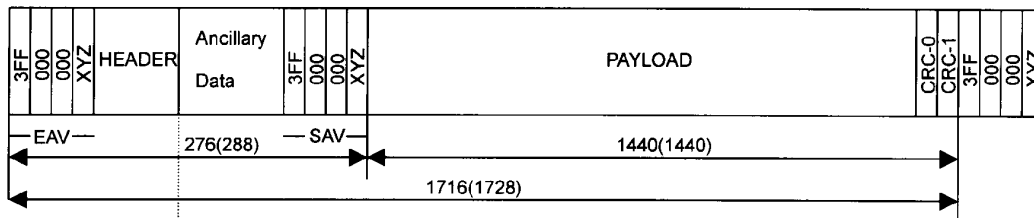


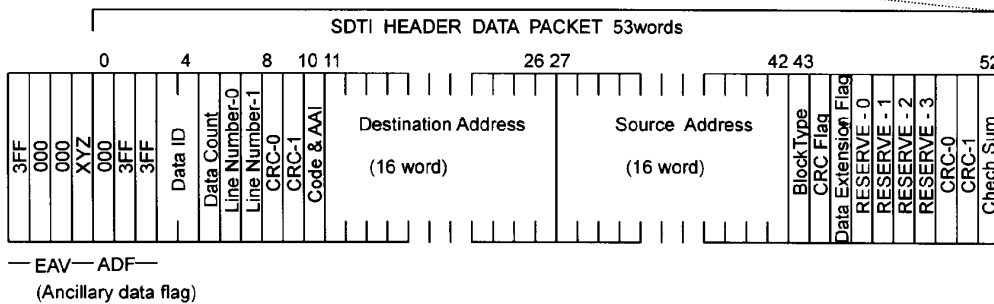
Figure 1 –Layers of signal processing and related standards

Table 1 –Header data packet

Parameters	Length	Value
ADF	3 words	[000h][3FFh][3FFh]
DI D	1 word	[140h]
SD ID	1 word	[101h]
DC	1 word	[22Eh]
Line number	2 words	—
Line number CRC	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]
Header CRC	2 words	—
CS	1 word	—



The figure in ( ) is for 625 Line System



— EAV — ADF —  
(Ancillary data flag)

Figure 2 –SDTI header data structure

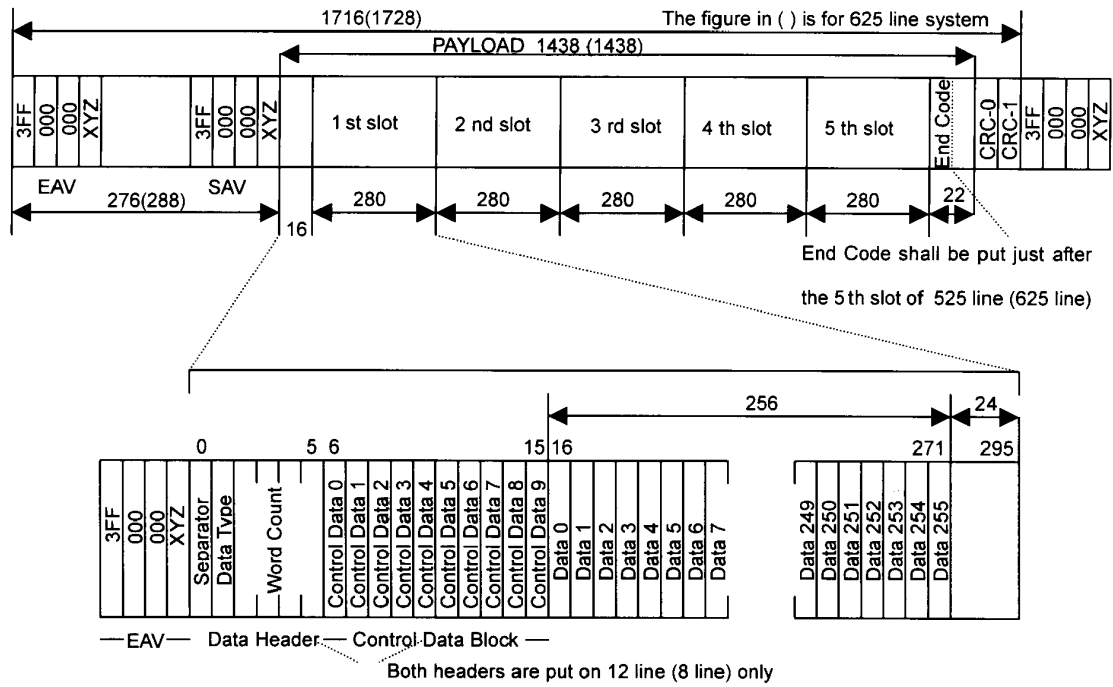


Figure 3 - Data structure

4.2 Data block header

The data block header, as specified in SM PTE 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 <sub>h</sub> ]
Data type	1 word	[241 <sub>h</sub> ]
Wordcount	4 words	[B4720 <sub>h</sub> ] (525/60 system) [D8F50 <sub>h</sub> ] (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 IEC 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 IEC 61834-2.

4.3.1 Secondary data type

The control data block and the data subts 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	

Table 3 –Controldata 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	Nom alspeed (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 unblocked
1	VCR servo blocked

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 subblock

Each data subblock 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
Sbt1	16
Sbt2	296
Sbt3	576
Sbt4	856
Sbt5	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 <sub>n</sub> ]

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 IEC 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 IEC 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):

$$(n, V0) - (n, V134); n = 0 \text{ to } 9$$

5.2.2 SC/VAUX sections

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

$$(n, SC0), (n, SC1), (n, VA0), (n, VA1), (n, VA2); n = 0 \text{ to } 9$$

5.2.3 Audio/AUX sections

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

$$(n, A0) - (n, A8); n = 0 \text{ to } 9$$

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):

$$(n, V0) - (n, V134); n = 0 \text{ to } 11$$

5.3.2 SC/VAUX sections

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

$$(n, SC0), (n, SC1), (n, VA0), (n, VA1), (n, VA2); n = 0 \text{ to } 11$$

5.3.3 Audio/AUX sections

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

$$(n, A0) - (n, A8); n = 0 \text{ to } 11$$

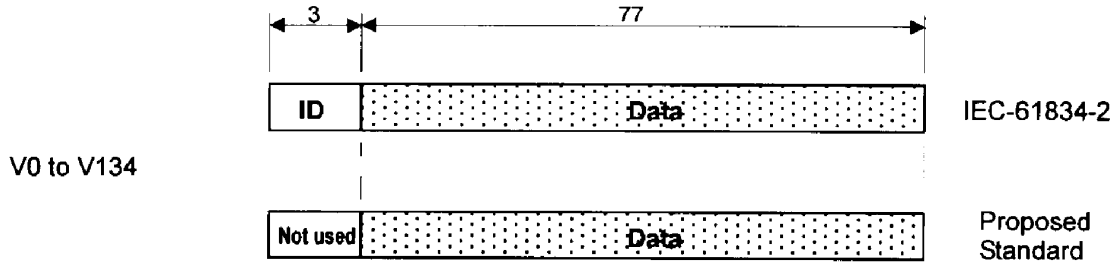


Figure 4 –Data in the video sections

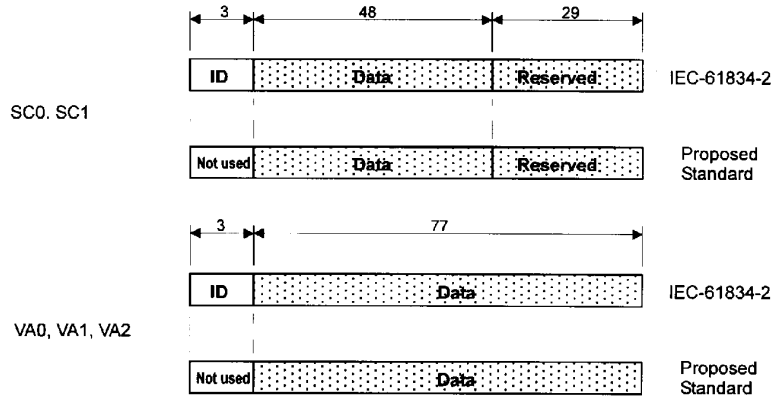


Figure 5 –Data in the SC/VAUX sections

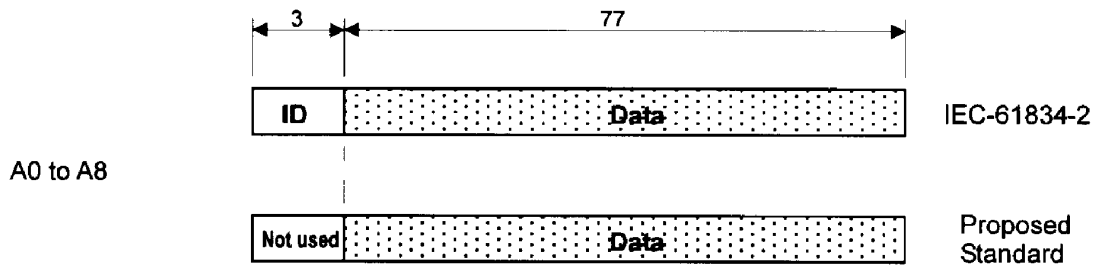


Figure 6 –Data in the audio/AUX sections



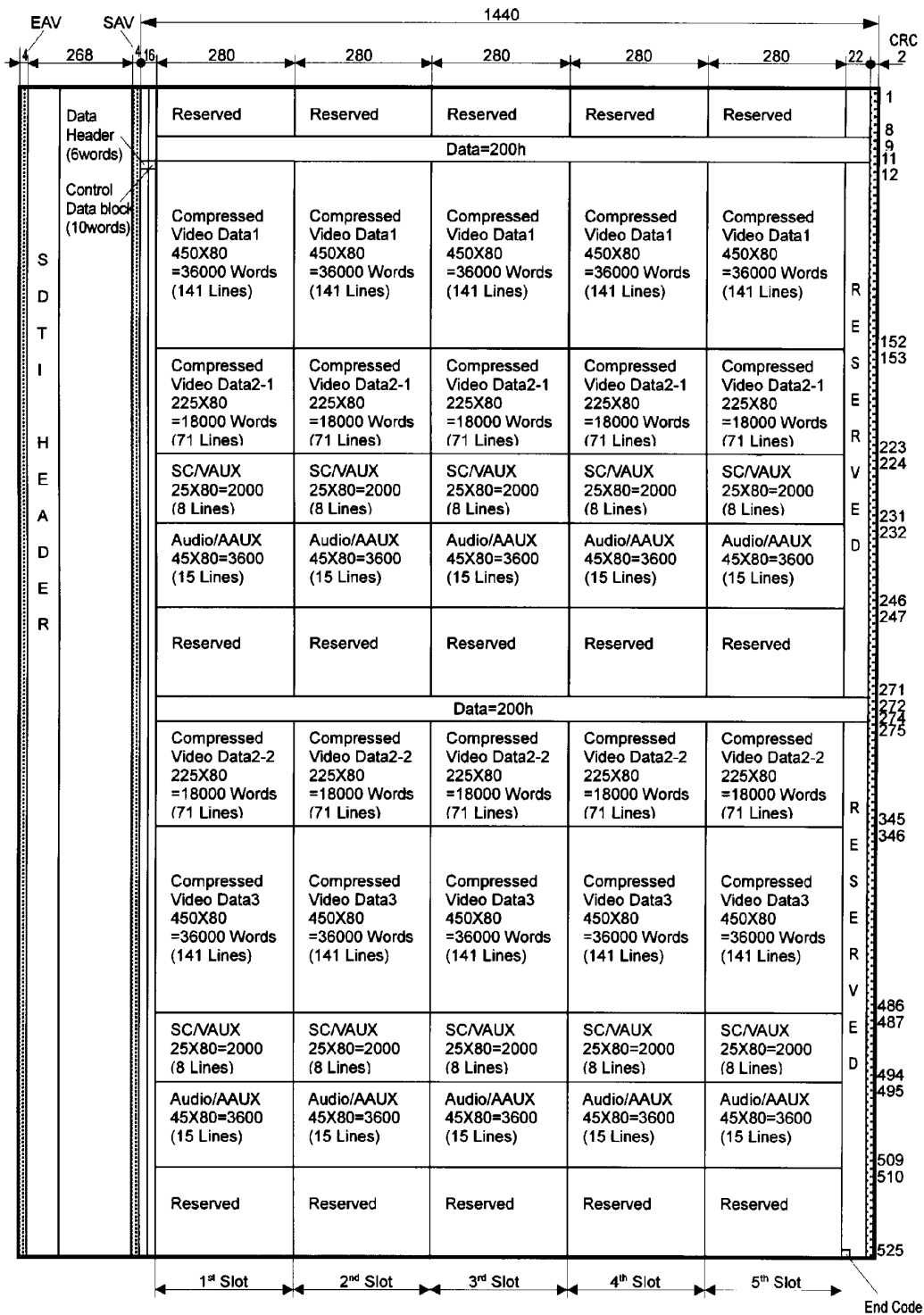


Figure 7 –Transmission form at for 525/60 system

SM PTE 322M -1999

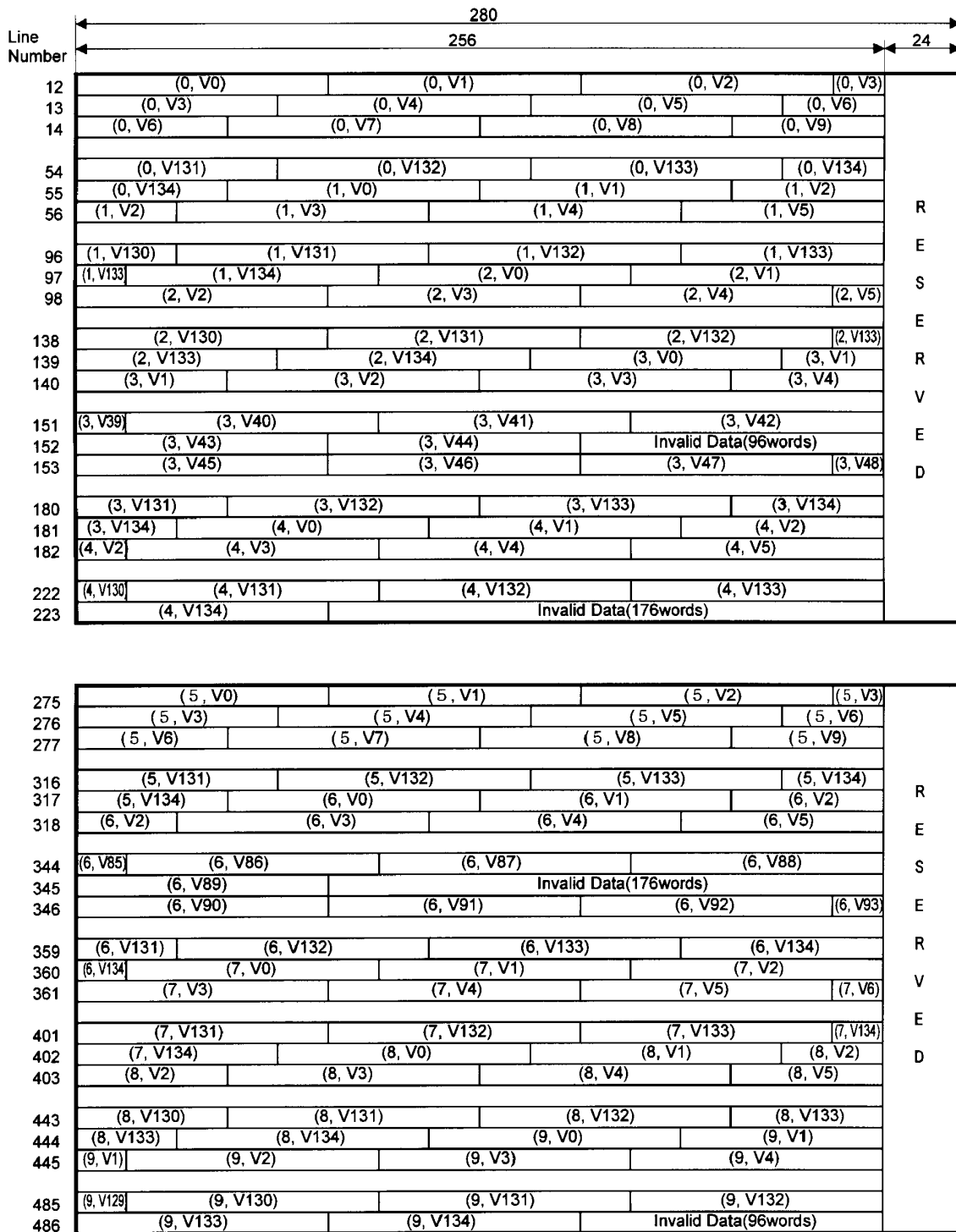


Figure 8 -Video sections for 525/60 system

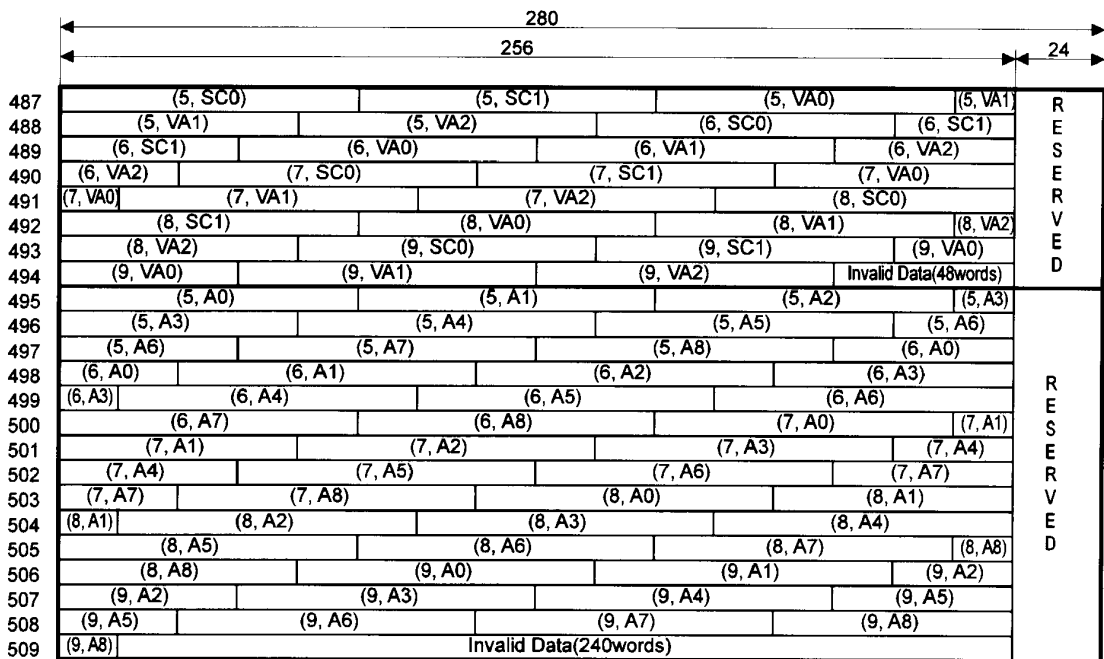
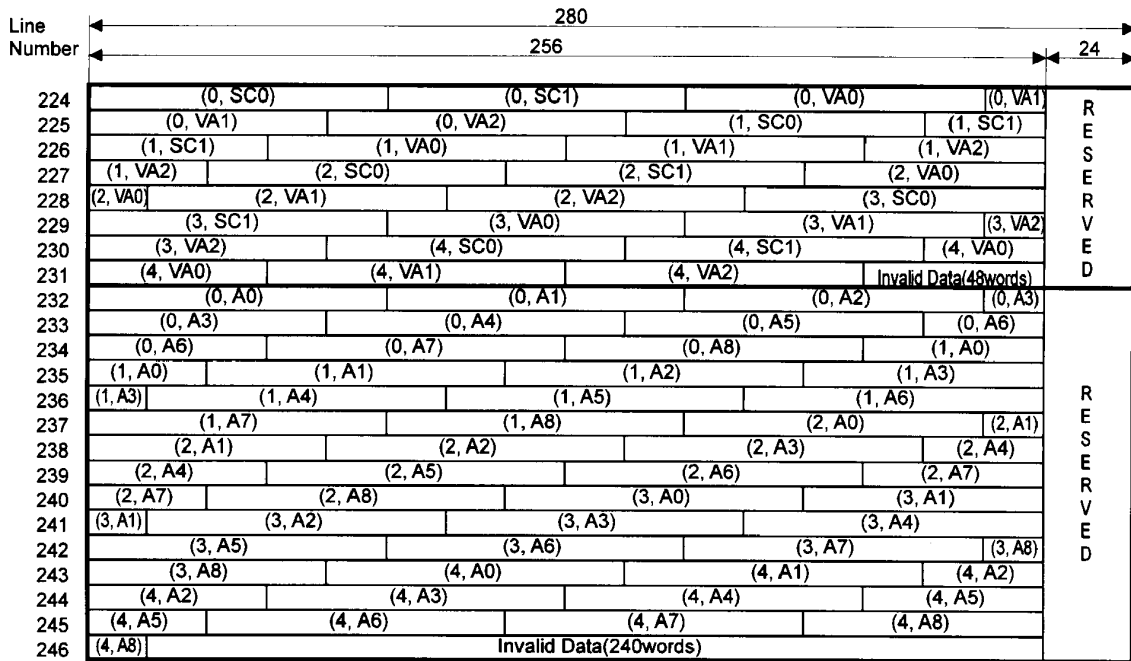


Figure 9 –SC VAUX and audio VAUX sections for 525/60 system

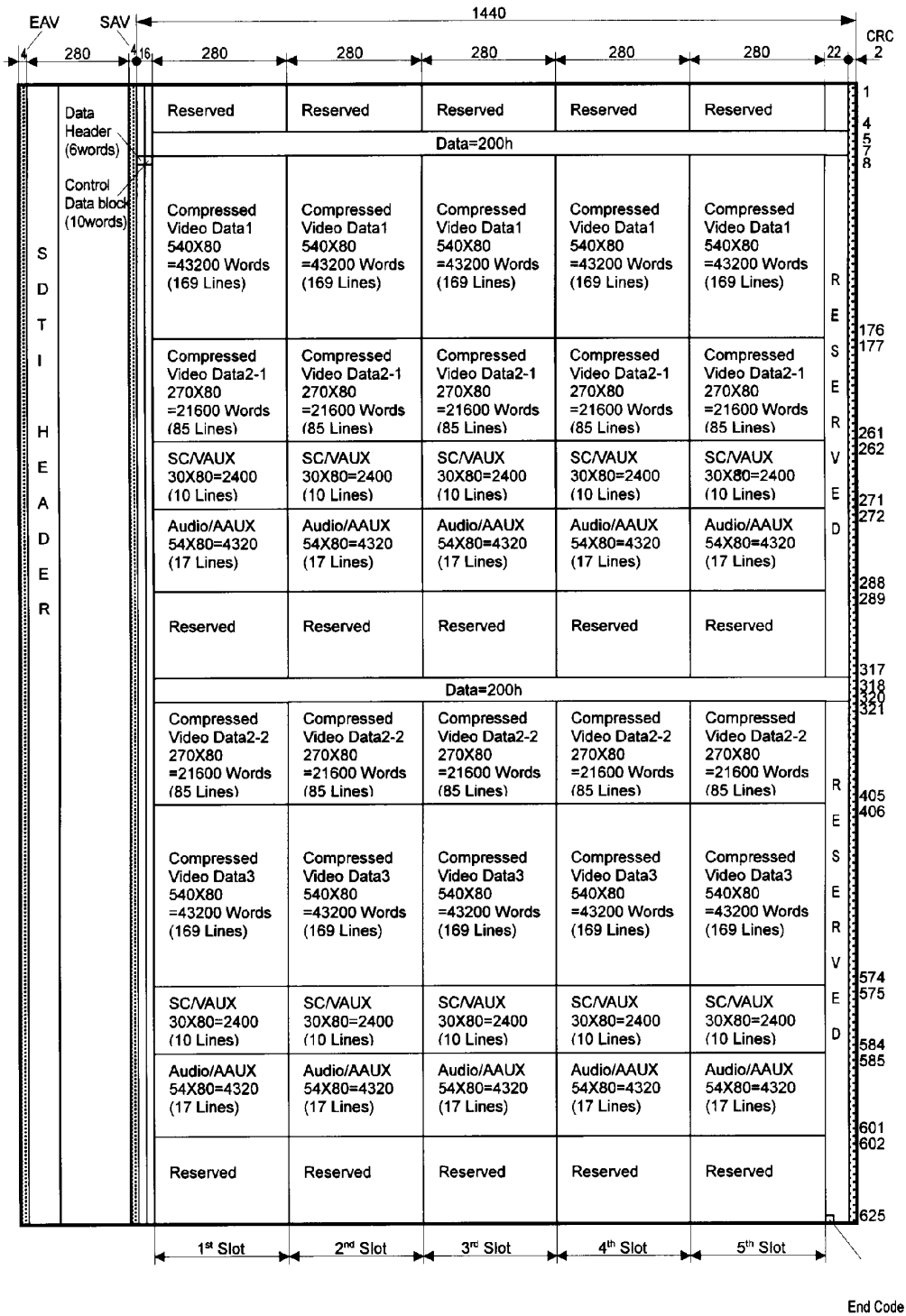


Figure 10 –Transmission form at for 625/50 system

Line Number	280			
	256			24
8	(0, V0)	(0, V1)	(0, V2)	(0, V3)
9	(0, V3)	(0, V4)	(0, V5)	(0, V6)
10	(0, V6)	(0, V7)	(0, V8)	(0, V9)
49	(0, V131)	(0, V132)	(0, V133)	(0, V134)
50	(0, V134)	(1, V0)	(1, V1)	(1, V2)
51	(1, V2)	(1, V3)	(1, V4)	(1, V5)
91	(1, V130)	(1, V131)	(1, V132)	(1, V133)
92	(1, V133)	(1, V134)	(2, V0)	(2, V1)
93	(2, V2)	(2, V3)	(2, V4)	(2, V5)
133	(2, V130)	(2, V131)	(2, V132)	(2, V133)
134	(2, V133)	(2, V134)	(3, V0)	(3, V1)
135	(3, V1)	(3, V2)	(3, V3)	(3, V4)
175	(3, V129)	(3, V130)	(3, V131)	(3, V132)
176	(3, V132)	(3, V133)	(3, V134)	Invalid Data(64words)
177	(4, V0)	(4, V1)	(4, V2)	(4, V3)
218	(4, V131)	(4, V132)	(4, V133)	(4, V134)
219	(4, V134)	(5, V0)	(5, V1)	(5, V2)
220	(5, V2)	(5, V3)	(5, V4)	(5, V5)
260	(5, V130)	(5, V131)	(5, V132)	(5, V133)
261	(5, V133)	(5, V134)	Invalid Data(160words)	
321	(6, V0)	(6, V1)	(6, V2)	(6, V3)
322	(6, V3)	(6, V4)	(6, V5)	(6, V6)
323	(6, V6)	(6, V7)	(6, V8)	(6, V9)
362	(6, V131)	(6, V132)	(6, V133)	(6, V134)
363	(6, V134)	(7, V0)	(7, V1)	(7, V2)
364	(7, V2)	(7, V3)	(7, V4)	(7, V5)
404	(7, V130)	(7, V131)	(7, V132)	(7, V133)
405	(7, V133)	(7, V134)	Invalid Data(160words)	
406	(8, V0)	(8, V1)	(8, V2)	(8, V3)
447	(7, V131)	(8, V132)	(8, V133)	(8, V134)
448	(8, V134)	(9, V0)	(9, V1)	(9, V2)
449	(9, V2)	(9, V3)	(9, V4)	(9, V5)
489	(9, V131)	(9, V132)	(9, V133)	(9, V134)
490	(9, V134)	(10, V0)	(10, V1)	(10, V2)
491	(10, V3)	(10, V4)	(10, V5)	(10, V6)
531	(10, V130)	(10, V131)	(10, V132)	(10, V133)
532	(10, V133)	(10, V134)	(11, V0)	(11, V1)
533	(11, V1)	(11, V2)	(11, V3)	(11, V4)
573	(11, V129)	(11, V130)	(11, V131)	(11, V132)
574	(11, V132)	(11, V133)	(11, V134)	Invalid Data(64words)

Figure 11 -Video sections for 625/50 system

Line Number	280				
	256			24	
262	(0, SC0)	(0, SC1)	(0, VA0)	(0, VA1)	RESERVED
263	(0, VA1)	(0, VA2)	(1, SC0)	(1, SC1)	
264	(1, SC1)	(1, VA0)	(1, VA1)	(1, VA2)	
265	(1, VA2)	(2, SC0)	(2, SC1)	(2, VA0)	
266	(2, VA0)	(2, VA1)	(2, VA2)	(3, SC0)	
267	(3, SC1)	(3, VA0)	(3, VA1)	(3, VA2)	
268	(3, VA2)	(4, SC0)	(4, SC1)	(4, VA0)	
269	(4, VA0)	(4, VA1)	(4, VA2)	(5, SC0)	
270	(5, SC0)	(5, SC1)	(5, VA0)	(5, VA1)	
271	(5, VA1)	(5, VA2)	Invalid Data(160words)		
272	(0, A0)	(0, A1)	(0, A2)	(0, A3)	RESERVED
273	(0, A3)	(0, A4)	(0, A5)	(0, A6)	
274	(0, A6)	(0, A7)	(0, A8)	(1, A0)	
275	(1, A0)	(1, A1)	(1, A2)	(1, A3)	
276	(1, A3)	(1, A4)	(1, A5)	(1, A6)	
277	(1, A7)	(1, A8)	(2, A0)	(2, A1)	
278	(2, A1)	(2, A2)	(2, A3)	(2, A4)	
279	(2, A4)	(2, A5)	(2, A6)	(2, A7)	
280	(2, A7)	(2, A8)	(3, A0)	(3, A1)	
281	(3, A1)	(3, A2)	(3, A3)	(3, A4)	
282	(3, A5)	(3, A6)	(3, A7)	(3, A8)	
283	(3, A8)	(4, A0)	(4, A1)	(4, A2)	
284	(4, A2)	(4, A3)	(4, A4)	(4, A5)	
285	(4, A5)	(4, A6)	(4, A7)	(4, A8)	
286	(4, A8)	(5, A0)	(5, A1)	(5, A2)	
287	(5, A3)	(5, A4)	(5, A5)	(5, A6)	
288	(5, A6)	(5, A7)	(5, A8)	Invalid(32words)	
575	(6, SC0)	(6, SC1)	(6, VA0)	(6, VA1)	RESERVED
576	(6, VA1)	(6, VA2)	(7, SC0)	(7, SC1)	
577	(7, SC1)	(7, VA0)	(7, VA1)	(7, VA2)	
578	(7, VA2)	(8, SC0)	(8, SC1)	(8, VA0)	
579	(8, VA0)	(8, VA1)	(8, VA2)	(9, SC0)	
580	(9, SC1)	(9, VA0)	(9, VA1)	(9, VA2)	
581	(9, VA2)	(10, SC0)	(10, SC1)	(10, VA0)	
582	(10, VA0)	(10, VA1)	(10, VA2)	(11, SC0)	
583	(11, SC0)	(11, SC1)	(11, VA0)	(11, VA1)	
584	(11, VA1)	(11, VA2)	Invalid Data(160words)		
585	(6, A0)	(6, A1)	(6, A2)	(6, A3)	RESERVED
586	(6, A3)	(6, A4)	(6, A5)	(6, A6)	
587	(6, A6)	(6, A7)	(6, A8)	(7, A0)	
588	(7, A0)	(7, A1)	(7, A2)	(7, A3)	
589	(7, A3)	(7, A4)	(7, A5)	(7, A6)	
590	(7, A7)	(7, A8)	(8, A0)	(8, A1)	
591	(8, A1)	(8, A2)	(8, A3)	(8, A4)	
592	(8, A4)	(8, A5)	(8, A6)	(8, A7)	
593	(8, A7)	(8, A8)	(9, A0)	(9, A1)	
594	(9, A1)	(9, A2)	(9, A3)	(9, A4)	
595	(9, A5)	(9, A6)	(9, A7)	(9, A8)	
596	(9, A8)	(10, A0)	(10, A1)	(10, A2)	
597	(10, A2)	(10, A3)	(10, A4)	(10, A5)	
598	(10, A5)	(10, A6)	(10, A7)	(10, A8)	
599	(10, A8)	(11, A0)	(11, A1)	(11, A2)	
600	(11, A3)	(11, A4)	(11, A5)	(11, A6)	
601	(11, A6)	(11, A7)	(11, A8)	Invalid(32words)	

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

Annex A (informative)

Bibliography

ANSI/SM PTE 259M -1997, Television — 10-Bit 4:2:2 Component and 4<sub>fsc</sub> Composite Digital Signals — Serial Digital Interface

ITU-R BT.656-3, Interface for Digital Component Video Signals in 525-Line and 625-Line Television Systems Operating at the 4:2:2 Level of Recommendation ITU-R BT.601

SM PTE RP 168-1993, Definition of Vertical Interval Switching Point for Synchronous Video Switching