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SMPTE RECOMMENDED PRACTICE**RP 181-1999**Revision of
RP 181-1994

Audio Sector Time Code and Equipment Type Information for 19-mm Type D-1 Digital Component Recording



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1 Scope

This practice is intended to provide an audio sector time code (ASTC) and an equipment type information (ETI). The ASTC can assist the D-1 DTTR to accurately read time code, especially under still-frame conditions. The ETI is designed to provide identification of the record DTTR. This practice applies to recorders operating on the 525-line television system with a frame frequency of 29.97 Hz and the 625-line television system with a frame frequency of 25 Hz.

2 ASTC general

ASTC shall be:

- A time code internal to the D-1 DTTR for the purpose of assisting LTC under some operational modes.
- Derived from LTC and be recorded in the user bit area of audio sectors of D-1 helical tracks.
- Recordable or editable independently from digital audio data so as to be consistent with LTC in terms of lift-off capability of audio data using advance read heads.

NOTE – Lift-off for the purpose of this practice is to read-rewrite the data.

3 ASTC format

3.1 Time code data, binary groups data, and assigned and unassigned bits are extracted from LTC bits. The other bits are ignored. The ordering of the extracted bits are rearranged to form two different types of data groups. The first group contains the time code and the second group contains the binary groups, as shown in figure 1.

3.2 The time code data, namely frame, second, minute, and hour, are placed into the user-control word area of the digital audio data block as defined in ANSI/SMPTE 227M (see figure 2). The relation between LTC data and the user-control words is shown in figure 1.

4 ASTC channel allocation

4.1 The ASTC is changing every frame. Within one frame, the ASTC is written in every audio data block of audio channels 2, 3, and 4 (see figure 3).

4.2 One frame contains 5 audio segments (525/60 — see figure 5) or 6 audio segments (625/50 — see figure 4). One audio segment contains 16 audio data blocks, four for every audio channel distributed in EVEN- and ODD-data blocks, which are recorded twice (see figure 3).

4.3 The EVEN- and ODD-data blocks of channels 2, 3, and 4 contain the same ASTC information within one frame (as shown in figures 4 and 5).

5 ETI general

ETI shall be:

- An equipment type information internal to the D-1 DTTR for the purpose of providing identification of the record DTTR.
- Derived from internal manufacturer settings and be recorded in the user bit area of audio sectors of D-1 helical tracks.
- Recordable or editable independently from digital audio data so as to be consistent with the recorded video data.

Longitudinal Time Code			Audio Data Block		
Bit No.	Coding		ASTC Data	USER No. EVEN	USER No. ODD
Bit 0	1		Bit 0	USER0	USER1
Bit 1	2	Frame	Bit 1		
Bit 2	4	Units	Bit 2		
Bit 3	8		Bit 3		
Bit 8	10	Frame	Bit 4		
Bit 9	20	tens	Bit 5		
Bit 10		Drop frame flag	Bit 6		
Bit 11		Color frame flag	Bit 7		
Bit 16	1		Bit 0	USER2	USER3
Bit 17	2	Seconds	Bit 1		
Bit 18	4	Units	Bit 2		
Bit 19	8		Bit 3		
Bit 24	10		Bit 4		
Bit 25	20	Seconds	Bit 5		
Bit 26	40	tens	Bit 6		
Bit 27		Biphase mark correction bit	Bit 7		
Bit 32	1		Bit 0	USER4	USER5
Bit 33	2	Minutes	Bit 1		
Bit 34	4	Units	Bit 2		
Bit 35	8		Bit 3		
Bit 40	10		Bit 4		
Bit 41	20	Minutes	Bit 5		
Bit 42	40	tens	Bit 6		
Bit 43		Binary group flag bit	Bit 7		
Bit 48	1		Bit 0	USER6	USER7
Bit 49	2	Hours	Bit 1		
Bit 50	4	Units	Bit 2		
Bit 51	8		Bit 3		
Bit 56	10	Hours	Bit 4		
Bit 57	20	tens	Bit 5		
Bit 58		Unassigned address bit	Bit 6		
Bit 59		Binary group flag bit	Bit 7		
Bit 4	Bit0		Bit 0	USER8	USER9
Bit 5	Bit1	1st	Bit 1		
Bit 6	Bit2	Binary Group	Bit 2		
Bit 7	Bit3		Bit 3		
Bit 12	Bit0		Bit 4		
Bit 13	Bit1	2nd	Bit 5		
Bit 14	Bit2	Binary Group	Bit 6		
Bit 15	Bit3		Bit 7		
Bit 20	Bit0		Bit 0	USER10	USER11
Bit 21	Bit1	3d	Bit 1		
Bit 22	Bit2	Binary Group	Bit 2		
Bit 23	Bit3		Bit 3		
Bit 28	Bit0		Bit 4		
Bit 29	Bit1	4th	Bit 5		
Bit 30	Bit2	Binary Group	Bit 6		
Bit 31	Bit3		Bit 7		
Bit 36	Bit0		Bit 0	USER12	USER13
Bit 37	Bit1	5th	Bit 1		
Bit 38	Bit2	Binary Group	Bit 2		
Bit 39	Bit3		Bit 3		
Bit 44	Bit0		Bit 4		
Bit 45	Bit1	6th	Bit 5		
Bit 46	Bit2	Binary Group	Bit 6		
Bit 47	Bit3		Bit 7		
Bit 52	Bit0		Bit 0	USER14	USER15
Bit 53	Bit1	7th	Bit 1		
Bit 54	Bit2	Binary Group	Bit 2		
Bit 55	Bit3		Bit 3		
Bit 60	Bit0		Bit 4		
Bit 61	Bit1	8th	Bit 5		
Bit 62	Bit2	Binary Group	Bit 6		
Bit 63	Bit3		Bit 7		

Figure 1 – ASTC data structure