RP 170-1993

SMPTE RECOMMENDED PRACTICE

Video Tape Recorder Type-Specific Messages for Digital Control Interface

1 Scope

This practice describes the type-specific messages used for the control of video tape recorder devices. Video tape recorder type-specific messages are used to provide the means for the control and monitoring of a specific type of virtual machine within a general-purpose communications channel of an interface system. This interface system transports data and digital control signals between equipment utilized in the production, post-production, and/or transmission of visual and aural information.

2 General

2.1 Virtual machine type

Video tape recorders shall be identified as a virtual machine of a type which is uniquely coded as “02,” expressed as an 8-bit word, in hexadecimal form. This identification shall apply to both analog and digital video tape recorders.

2.2 Notation

This practice describes the coding of keywords and information fields (I/F) in the form shown below. The coding “NN” represents the assigned keyword or I/F code in hexadecimal form.

NN	KEYWORD or I/F NAME	Keyword or I/F descriptive text	
	Format:	<COMMAND>	
		<PARAMETER NAME 0>	[Parameter description;
		...	Parameter value coding, scale, or range;
		<PARAMETER NAME n>	Parameter definitions and explanations.]

In the practices listed in annex B, keywords are listed numerically, in hexadecimal notation. Keyword numbers are reserved as follows:

Keywords 00_h – $1F_h$: System service subset
Keywords 20_h – $3F_h$: Common message subset
Keywords 40_h – FF_h: Virtual machine type-specific subset

NOTES
1 All tape motion commands (indicated below as “TMC”) are mutually exclusive.
2 In all cases, the temporal order of entries and exits must be preserved. Thus, an entry received later in time, at the same position on the timeline, will cancel an existing exit.

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3 Summary of keywords, mnemonics, and information field names

Hex	Keyword	(mnemonic)
40	not used	
41	STOP	STOP
42	VARIABLE PLAY	VAPL
43	STD PLAY	STPL
44	STEP	STEP
45	VISIBLE FAST	VFST
46	SHUTTLE	SHUT
47	TAPE SPEED OVERRIDE	TSPO
48	READY SELECT	REDS
49	SERVO REFERENCE SELECT	SRES
4A	RECORD MODE SELECT	REMS
4B	ENTRY	ENTY
4C	EXIT	EXIT
4D	TAPE CODE SELECT	TACS
4E	TARGET SEARCH	TASE
4F	PREROLL SEARCH	PRSE
50	SYNC	SYNC
51	COLOR FRAMER SELECT	CFRS
52	EDIT FIELD SELECT	EDFS
53	CHASE	CHAS
54	TCG LTC TIMESOURCE SELECT	TLTS
55	TCG VITC TIMESOURCE SELECT	TVTS
56	TCG LTC UB SOURCE SELECT	TLUS
57	TCG VITC UB SOURCE SELECT	TVUS
58	EJECT/UNTHREAD	EJCT
59	not used	
5A	not used	
5B	not used	
5C	not used	
5D	not used	
5E	TRACKING SELECT	TRKS
5F	ANTI-CLOG CONTROL	ANCC
60	PRESET	PRST
61	not used	
62	not used	
63	not used	
64	not used	
65	PLAYBACK CHANNEL SELECT	PLCS
66	CHANNEL MUTE SELECT	CMUS
67	TAPE/EE SELECT	TEES
68	not used	
69	not used	
6A	not used	
6B	not used	
6C	not used	
6D	not used	
6E	not used	
6F	not used	

Hex	I/F name	(mnemonic)
40	not used	
41	LTC FROM TAPE	LTFT
42	VITC FROM TAPE	VIFT
43	SELECTED TAPE CODE	SETC
44	USERBITS FROM TAPE LTC	UFTL
45	USERBITS FROM TAPE VITC	UFTV
46	TT1 (Tape Timer 1)	TTON
47	TT2 (Tape Timer 2)	TTTW
48	READY TALLY	REDT
49	SERVO REFERENCE TALLY	SRET
4A	RECORD MODE TALLY	REMT
4B	CHANNEL RECORD STATUS	CRES
4C	CHANNEL RECORD MASK	CREM
4D	TAPE CODE SELECTION TALLY	TACT
4E	SYNC VELOCITY	SVTY
4F	PREROLL DURATION	PRDU
50	SYNC POINT	SPNT
51	COLOR FRAMER TALLY	CFRT
52	EDIT FIELD TALLY	EDFT
53	not used	
54	TCG LTC TIMESOURCE TALLY	TLTT
55	TCG VITC TIMESOURCE TALLY	TVTT
56	TCG LTC UB SOURCE TALLY	TLUT
57	TCG VITC UB SOURCE TALLY	TVUT
58	not used	
59	not used	
5A	TAPELENGTH	TLTH
5B	PARKING ACCURACY	PARK
5C	SYNCHRONISM ACCURACY	SYAC
5D	not used	
5E	TRACKING SELECTION TALLY	TRKT
5F	ANTI-CLOG CONTROL TALLY	ANCT
60	not used	
61	TMC TALLY	TMCT
62	VELOCITY TALLY	VELT
63	TIMELINE CORRECTION TALLY	TLCT
64	not used	
65	PLAYBACK CHANNEL TALLY	PLCT
66	CHANNEL MUTE TALLY	CMUT
67	TAPE/EE TALLY	TEET
68	TIMECODE TO TAPE LTC	TTTL
69	TIMECODE TO TAPE VITC	TTTV
6A	USERBITS TO TAPE LTC	UTTL
6B	USERBITS TO TAPE VITC	UTTV
6C	PRESETTABLE TIME SRC LTC	PTSL
6D	PRESETTABLE TIME SRC VITC	PTSV
6E	PRESETTABLE UB SOURCE LTC	PUSL
6F	PRESETTABLE UB SOURCE VITC	PUSV

4 KEYWORDS

Hex	Keyword	
40	not used	
41	STOP	(TMC) Causes the controlled VTR to stop as soon as possible; indeterminate picture.
	Format: <STOP>	
42	VARIBLE PLAY	(TMC) Causes the controlled VTR to enter continuously variable playback mode with specified direction and speed.
	Format: <VARIABLE PLAY> <SPEED>	3-byte signed binary number: two's complement scale: 000000_h = still 010000_h = std play speed forward $7F0000_h$ = approximately 127 times standard play speed forward $FF0000_h$ = std play speed reverse 800000_h = 128 times standard play speed reverse
43	STD PLAY	(TMC) Causes the controlled VTR to enter field-locked real time playback mode, color framed as selected.
	Format: <STD PLAY>	
44	STEP	(TMC) Causes the controlled VTR to move the tape a specified number of fields forward or backward, with respect to its current position, only while in TMCs: STEP, TAPE SPEED OVERRIDE, VISIBLE FAST (STILL), or VARIABLE PLAY (STILL). Successive commands are cumulative until next TMC other than STEP.
	Format: <STEP> <FIELD NUMBER>	1-byte signal number; range: –128 ... +127.
45	VISIBLE FAST	(TMC) Causes the controlled VTR to enter fast tape motion with visible but not necessarily broadcastable picture, with specified direction and speed.
	Format: <VISIBLE FAST> <SPEED>	3-byte signed binary number; same format as in VARIABLE PLAY.

46 SHUTTLE

(TMC) Causes the controlled VTR to travel at specified direction and speed without necessarily reproducing picture or sound.

Format: <SHUTTLE>
<SPEED> 3-byte signed binary number; same format as VARIABLE PLAY.

47 TAPE SPEED OVERRIDE

(TMC) Causes the controlled VTR to override instantaneous play speed for synchronizing purposes.

Format: <TAPE SPEED OVERRIDE>
<SPEED> 3-byte signed binary number; same format as in VARIABLE PLAY.

48 READY SELECT

Establishes the VTR in a state to minimize start-up time.

Format: <READY SELECT>
<SWITCH> Boolean value: 00_h = OFF (= default)
01_h = ON

49 SERVO REFERENCE SELECT

Selects the input switch for video reference source.

Format: <SERVO REFERENCE SELECT>
<MODE> 1-byte special binary code:
00_h = auto select (= default)
01_h = video in
02_h = external ref input
FF_h = as selected locally

4A RECORD MODE SELECT

Selects the mode of the subsequent recording(s) or edit(s).

Format: <RECORD MODE>
<MODE> 1-byte special binary code:
00_h = record disable (= default)
01_h = insert
02_h = assemble; all channels
03_h = assemble; channel selectable
04_h = rehearsal
05_h = crash record
06_h = read-before-write

4B ENTRY

In any <RECORD MODE> other than "rehearsal," causes a start of edit insertion on the specified channel(s) or track(s). When <RECORD MODE> = "rehearsal," causes a signal system monitoring switch (e.g., tape-to-EE at entry point) to occur in the specified channel(s), such as to produce visual/aural simulation of commencement of recording.

Format: <ENTRY>
<CHANNELS>

3-byte bit mask:
bit 0 (LSB) = video
bit 1 = sync track
bit 2 = VITC
bit 3 = cue audio
bit 4 = reserved
bit 5 = reserved
bit 6 = reserved
bit 7 = LTC
bits 8–23 = audios 1–16, respectively
logic: 0 = channel not affected
1 = channel turned on or stays on

NOTES
1 In "assemble/all channels" mode, the channel bits have no meaning.
2 Bits 0–7 form the least significant byte; this byte is transmitted last.

4C EXIT

In any <RECORD MODE> other than "rehearsal," causes a termination of edit insertion on the specified channel(s) or track(s). When <RECORD MODE> = "rehearsal," causes a signal system monitoring switch (e.g., EE-to-tape at exit point) to occur in the specified channel(s), such as to produce visual/aural simulation of commencement of recording.

Format: <EXIT>
<CHANNELS>

3-byte bit mask:
bit 0 (LSB) = video
bit 1 = sync track
bit 2 = VITC
bit 3 = cue audio
bit 4 = reserved
bit 5 = reserved
bit 6 = reserved
bit 7 = LTC
bits 8–23 = audios 1–16, respectively
logic: 0 = channel not affected
1 = channel turned off or stays off

NOTES
1 In "assemble/all channels" mode, the channel bits have no meaning.
2 Bits 0–7 form the least significant byte; this byte is transmitted last.

4D TAPE CODE SELECT

Selects the type of code for all succeeding messages that refer to “TAPE CODE."

NOTE – As LTC, VITC, TT1, and TT2 are also contained in an item of the VTR-specific INFORMATION FIELD, they may be accessed by a READ command at any time, even if not selected as TAPE CODE by the command TAPE CODE SELECT.

Format: <TAPE CODE SELECT>
<CODE TYPE>

1-byte special binary code:
00_h = longitudinal time code (= default)
01_h = vertical interval time code
02_h = TT1
03_h = TT2
04_h = auto TC
FF_h = as selected locally

4E TARGET SEARCH

(TMC) Causes the controlled VTR to move to a defined tape position in accordance with the TAPE CODE.

Format: <TARGET SEARCH>
<TAPE CODE>

(type TIME; field referenced)

NOTE – The type of TAPE CODE is selected by the command TAPE CODE SELECT.

4F PREROLL SEARCH

(TMC) Causes the controlled VTR to move to a tape position determined by the duration of the PREROLL TIME in advance of the SYNC POINT and by the SYNC VELOCITY, in accordance with the TAPE CODE.

NOTE – PREROLL TIME, SYNC POINT, and SYNC VELOCITY are part of the VTR specific INFORMATION FIELD.

Format: <PREROLL SEARCH>

50 SYNC

(TMC) Causes the controlled VTR to start and synchronize so that after the preroll duration, the tape will be at the SYNC POINT and travelling at the SYNC VELOCITY.

NOTES
1 SYNC POINT and SYNC VELOCITY are part of the VTR-specific INFORMATION FIELD, and must be pre-defined by a PRESET command before execution.
2 The tape must be positioned and tallied previously by a PREROLL SEARCH command.
3 If the SYNC VELOCITY is standard play speed, the VTR reverts to STD PLAY after attaining sync.
4 In PAL, the VTR will be ADVANCED by one frame when necessary, to be in accordance with the P-phase, and the color framer will ADVANCE the VTR by as many frames as necessary.

Format: <SYNC>

51 COLOR FRAMER SELECT

Selects the color framer mode.

Format: <COLOR FRAMER>
<MODE>

1-byte special binary code:
bit 7 (msb):
0 = OFF – 2-field lock NTSC
– 4-field lock PAL/SECAM
1 = ON – 4-field lock NTSC
– 8-field lock PAL/SECAM
bit 6:
0 = normal lock
1 = inverted lock
bits 3–0:
nibble contains binary number, which specifies an offset from the lock specified above in units of fields. Exception: FF_h = as selected locally.

52 EDIT FIELD SELECT

Selects the edit field.

Format: <EDIT FIELD SELECT>
<MODE>

1-byte special binary code:
00_h = start of field 1 always
01_h = start of field 2 always
02_h = at next vertical in immediate mode, or determined by field bit of timeline if in timeline mode
FF_h = as selected locally

53 CHASE

(TMC) Maintains a given time offset between the selected tape code of the machine and the specified timeline using appropriate transport mode as determined by the timeline (usually with “external reference time” source; see common message TIMELINE SOURCE).

Format: <CHASE>
<OFFSET TIME>

(type TIME) Definition: offset = master-slave — e.g., if slave is to lead by 1 minute, send: 00 01 00 00; if slave is to lag by 1 minute, send: 23 59 00 00; i.e., “24 hours complement” notation.

54 TCG LTC TIME SOURCE SELECT

Selects the time source for the LTC time code generator of the controlled VTR.

Format: <TCG LTC TIME SOURCE SELECT>
<TIME SOURCE>

1-byte special binary code:
- 00_h = hold
- 01_h = run independently, starting with the value contained in I/F item PRESETTABLE TIME SOURCE LTC
- 02_h = run with external, unspecified source
- 03_h = run with the regenerated value of the LTC time code as source (also contained in the I/F field LTC from tape) until a record ENTRY of the LTC track; then continue independently, running with the time value most recently read from tape, i.e., "jam-sync" function
- 04_h = run with regenerated VITC time code from tape as source (also contained in I/F field VITC FROM TAPE), i.e., "copy function"
- 05_h = run with TAPE CODE as source (also contained in I/F field TAPE CODE

55 TCG VITC TIME SOURCE SELECT

Selects the time source for the VITC time code generator of the controlled VTR.

Format: <TCG VITC TIME SOURCE SELECT>
<TIME SOURCE>

1-byte special binary code:
- 00_h = hold
- 01_h = run independently, starting with the value contained in I/F item PRE-SETTABLE TIME SOURCE VITC
- 02_h = run with external, unspecified source
- 03_h = run with the regenerated value of the VITC time code as source (also contained in the I/F field VITC from tape) until a record ENTRY of the VITC track; then continue independently, running with the time value most recently read from tape, i.e., "jam-sync" function
- 04_h = run with regenerated LTC time code from tape as source (also contained in I/F field LTC FROM TAPE), i.e., "copy function"
- 05_h = run with TAPE CODE as source (also contained in I/F field TAPE CODE

56 TCG LTC USERBIT SOURCE SELECT — Selects the user source for the LTC time code generator of the controlled device.

Format: <TCG LTC USERBIT SOURCE SELECT>
<USERBIT SOURCE>

1-byte special binary code:
- 00_h = no userbits; i.e., all set to zero (= default)
- 01_h = userbits from I/F item PRESET-TABLE USERBIT SOURCE LTC, which may be preset by a PRESET command
- 02_h = userbits from external, unspecified source
- 03_h = userbits continuously copied from the LTC time code from tape (also contained in I/F field USERBITS FROM TAPE LTC)
- 04_h = userbits continuously copied from the VITC time code from tape (also contained in I/F field USERBITS FROM TAPE VITC)

57 TCG VITC USERBIT SOURCE SELECT — Selects the userbit source for the VITC time code generator of the controlled device

Format: <TCG VITC USERBIT SOURCE SELECT>
<USERBIT SOURCE>

1-byte special binary code:
- 00_h = no userbits; i.e., all set to zero (= default)
- 01_h = userbits from I/F item PRESET-TABLE USERBIT SOURCE VITC, which may be preset by a PRESET command
- 02_h = userbits from external, unspecified source
- 03_h = userbits continuously copied from the VITC time code from tape (also contained in I/F field USERBITS FROM TAPE VITC)
- 04_h = userbits continuously copied from the LTC time code from tape (also contained in I/F field USERBITS FROM TAPE LTC)

58 EJECT/UNTHREAD — (TMC) Ejects cassette or unthreads tape where applicable.

Format: <EJECT/UNTHREAD>

59 not used

5A not used

5B not used

5C not used

5D not used

5E TRACKING SELECT — Selects tracking mode.

Format: <TRACKING SELECT>
<MODE> — 1-byte special binary code:
00_h = FIXED (default)
01_h = AUTO
FF_h = as selected locally

5F ANTI-CLOG CONTROL — Switches the anti-clog mechanism on/off.

Format: <ANTI-CLOG CONTROL>
<MODE> — 1-byte special binary code:
00_h = ON (default)
01_h = OFF
02_h = extended
03_h = immediate tension release
FF_h = as selected locally

60 PRESET — Presets the named information field to the given value.

Format: <PRESET>
<PERMITTED INFORMATION FIELD NAME>
<FORMAT> — Format and coding defined by the I/F NAME (see clause 5, Information fields).

Permitted information field names for VTRs are:

TT1	SYNCHRONISM ACCURACY
TT2	CHANNEL RECORD MASK
SYNC VELOCITY	PRESETTABLE TIME SOURCE LTC
PREROLL DURATION	PRESETTABLE TIME SOURCE VITC
SYNC POINT	PRESETTABLE UB SOURCE LTC
TAPELENGTH	PRESETTABLE UB SOURCE VITC
PARKING ACCURACY	

61 not used

62 not used

63 not used

64 not used

65 PLAYBACK CHANNEL SELECT Selects the playback/monitoring channels.

Format: <PLAYBACK CHANNEL SELECT>
<CHANNELS>

3-byte bit mask:
bit 0 (LSB) = video
bit 1 = sync track
bit 2 = VITC
bit 3 = cue audio
bit 4 = reserved
bit 5 = reserved
bit 6 = reserved
bit 7 = LTC
bits 8–23 = audios 1–16 respectively

logic: 0 = playback channel
(= default for all channels)
1 = monitor channel (audio)
record channel (video)

NOTE – Bits 0–7 form the least significant byte; this byte is transmitted last.

66 CHANNEL MUTE SELECT Selects auto mute function.

Format: <CHANNEL MUTE SELECT>
<CHANNELS>

3-byte bit mask:
bit 0 (LSB) = video
bit 1 = sync track
bit 2 = VITC
bit 3 = cue audio
bit 4 = reserved
bit 5 = reserved
bit 6 = reserved
bit 7 = LTC
bits 8–23 = audios 1–16 respectively

logic: 0 = mute enabled
1 = mute disabled

NOTE – Bits 0–7 form the least significant byte; this byte is transmitted last.

67 TAPE/EE SELECT — Selects the tape/electronics switch.

Format: <TAPE/EE SELECT>
<MODE> — 1-byte special binary code:
00_h = auto (= default)
01_h = tape
02_h = EE
03_h = as selected locally

68 not used

69 not used

6A not used

6B not used

6C not used

6D not used

6E not used

6F not used

5 Information fields

NOTE – The items of the INFORMATION FIELD are accessed by the common messages: READ, UPDATE, CYCLE, or SIMULTANEOUS READ. They are tallied by the common messages: I/F RESPONSE or SIMULTANEOUS READ RESPONSE.

These commands use the format: <KEYWORD> <PARAMETER NAME> and <KEYWORD> <PARAMETER NAME> <PARAMETER VALUE> where the PARAMETER NAME uses the FIELD NAME specified below and the PARAMETER VALUE carries the FIELD CONTENTS specified below. Several names/values may be wrapped in a BEGIN/END construct. At power-up, the content of information fields is not specified.

40 not used

41 LTC FROM TAPE — Contains the longitudinal time code value most recently read from tape.

Format: <LTC FROM TAPE>
<CODE VALIDITY> — 1-byte special binary code:
00_h = valid LTC
01_h = derived LTC
FF_h = not valid LTC
<TIME VALUE> — standard “time” format

42 VITC FROM TAPE

Contains the vertical interval time code value most recently read from tape.

Format: <LTC FROM TAPE>

<CODE VALIDITY>	1-byte special binary code: 00_h = valid VITC 01_h = derived VITC FF_h = not valid VITC
<TIME VALUE>	standard “time” format

43 SELECTED TAPE CODE

Contains the time value of that code (LTC, VITC, etc.) which has been most recently selected by the TAPE CODE SELECT command.

Format: <SELECTED TAPE CODE>

<IDENTIFIER>	1-byte special binary code: 00_h = LTC 01_h = VITC 02_h = TT1 03_h = TT2 04_h = auto TC FF_h = invalid
<TIME VALUE>	standard “time” format

44 USERBITS FROM TAPE LTC

Contains the LTC userbit contents most recently read from tape.

Format: <USERBITS FROM TAPE LTC>

<UB SPECIFICATION>	1-byte special code: bits 0, 1: 0, 0 – content of userbits unspecified 1, 0 – content of userbits is 8-bit character set conforming to ISO/IEC 646 and ISO 2022 0, 1 – unassigned 1, 1 – unassigned bit 2: 0 – unassigned 1 – content of userbits is secondary time data in standard time format bits 3–7: 0 – set to 0 until assigned
<UB GROUP 8/UB GROUP 7> <UB GROUP 6/UB GROUP 5> <UB GROUP 4/UB GROUP 3> <UB GROUP 2/UB GROUP 1> (MSnibble)	4 bytes, each consisting of two 4-bit nibbles, each containing one UB group

NOTE – UB 1 is the UB group which comes first on the tape.

45 USERBITS FROM TAPE VITC

Contains the VITC userbit contents most recently read from tape.

Format: <USERBITS FROM TAPE VITC>
<UB SPECIFICATION>
<UB GROUP 8/UB GROUP 7>
<UB GROUP 6/UB GROUP 5>
<UB GROUP 4/UB GROUP 3>
<UB GROUP 2/UB GROUP 1>

For format description, see USERBITS FROM TAPE LTC.

46 TT1 (Tape Timer 1)

Contains the instantaneous counting status of tape timer 1.

Format: <TT1>
<TIME VALUE>

Standard “time” format.

47 TT2 (Tape Timer 2)

Contains the instantaneous counting status of tape timer 2.

Format: <TT2>
<TIME VALUE>

Standard “time” format.

48 READY TALLY

Tallies the status set by the READY SELECT command.

Format: <READY TALLY>
<SWITCH>

Boolean value
00_h = OFF
01_h = ON

49 SERVO REFERENCE TALLY

Tallies the status set by the SERVO REFERENCE SELECT command.

Format: <SERVO REFERENCE TALLY>
<MODE>

1-byte special binary code:
00_h = auto select
01_h = video in
02_h = external ref input

4A RECORD MODE TALLY

Tallies the status set by the RECORD MODE SELECT command.

Format: <RECORD MODE TALLY>
<MODE>

1-byte special binary code:
00_h = record disable
01_h = insert
02_h = assemble; all channels
03_h = assemble; channel selectable
04_h = rehearsal
05_h = crash record
06_h = read-before-write

4B CHANNEL RECORD STATUS

Tallies the status of the recording channels controlled by the ENTRY and EXIT commands.

Format: <ENTRY>
<CHANNELS>

3-byte bit mask:
bit 0 (LSB) = video
bit 1 = sync track
bit 2 = VITC
bit 3 = cue audio
bit 4 = reserved
bit 5 = reserved
bit 6 = reserved
bit 7 = LTC
bits 8–23 = audios 1–16 respectively

logic: 0 = not recording
1 = recording

NOTE – Bits 0–7 form the least significant byte; this byte is transmitted last.

4D TAPE CODE SELECTION TALLY

Tallies the code currently selected by the most recent TAPE CODE SELECT command.

Format: <TAPE CODE SELECTION TALLY>
<CODE TYPE>

1-byte special binary code:
00_h = longitudinal time code
01_h = vertical interval time code
02_h = TT1
03_h = TT2
04_h = auto TC

4E SYNC VELOCITY

Contains a velocity used as the synchronization velocity for the SYNC command.

Format: <SYNC VELOCITY>
<SPEED>

3-byte signed binary number; two's complement scale:
000000_h = still
010000_h = std play speed forward
$7F0000_h$ = approximately 127 times standard play speed forward
$FF0000_h$ = std play speed reverse
800000_h = 128 times standard play speed reverse

NOTE – This is the same coding as in the argument of the VARIABLE PLAY command. Default is standard play speed.

4F PREROLL DURATION

Contains the preroll time used in advance of synchronizing processes.

Format: <PREROLL DURATION>
<TIME VALUE> Standard “time” format.

50 SYNC POINT

Contains a TAPE CODE value used as the SYNChronization POINT for the SYNC command.

Format: <SYNC POINT>
<TIME VALUE> Standard “time” format.

51 COLOR FRAMER TALLY

Tallies the status of the color framer selected by the COLOR FRAMER SELECT command.

Format: <COLOR FRAMER TALLY>
<MODE>

1-byte special binary code:
bit 7 (MSB):
0 = OFF – 2-field lock NTSC
– 4-field lock PAL/SECAM
1 = ON – 4-field lock NTSC
– 8-field lock PAL/SECAM
bit 6:
0 = normal lock
1 = inverted lock
bits 3–0:
nibble contains binary number which specifies an offset from the lock specified above in units of fields

52 EDIT FIELD TALLY

Tallies the status set by the EDIT FIELD SELECT command.

Format: <EDIT FIELD TALLY>
<MODE>

1-byte special binary code:
00_h = start of field 1 always
01_h = start of field 2 always
02_h = at next vertical in immediate mode or determined by field bit of timeline if in timeline mode
FF_h = as selected locally

53 not used

54 TCG LTC TIME SOURCE TALLY

Tallies the status of the time code generator for the longitudinal time code selected by the TCG LTC TIME SOURCE SELECT command.

Format: <TCG LTC TIME SOURCE TALLY>
<TIME SOURCE>

1-byte special binary code:
- 00_h = hold
- 01_h = running independently, starting with the value contained in I/F item PRE-SETTABLE TIME SOURCE LTC
- 02_h = running with external, unspecified source
- 03_h = running with the regenerated value of the LTC time code as source (also contained in the I/F field LTC FROM TAPE) until a record ENTRY of the LTC track; then continuing independently, running with the time value most recently read from tape, i.e., "jam-sync" function
- 04_h = running with regenerated VITC time code from tape as source (also contained in I/F field VITC FROM TAPE), i.e., "copy function"
- 05_h = running with TAPE CODE as source (also contained in I/F field TAPE CODE

55 TCG VITC TIME SOURCE TALLY

Tallies the status of the time code generator for the vertical interval time code selected by the TCG VITC TIME SOURCE SELECT command.

Format: <TCG VITC TIME SOURCE TALLY>
<TIME SOURCE>

1-byte special binary code:
- 00_h = hold
- 01_h = running independently, starting with the value contained in I/F item PRESETTABLE TIME SOURCE VITC
- 02_h = running with external, unspecified source
- 03_h = running with the regenerated value of the VITC time code as source (also contained in the I/F field VITC FROM TAPE) until a record ENTRY of the VITC track; then continuing independently, running with the time value most recently read from tape, i.e., "jam-sync" function

04_h = running with regenerated LTC time code from tape as source (also contained in I/F field LTC FROM TAPE), i.e., "copy function"
05_h = running with TAPE CODE as source (also contained in I/F field TAPE CODE

56 TCG LTC USERBIT SOURCE TALLY — Tallies the status of the time code generator for the longitudinal time code selected by the TCG LTC UB SOURCE SELECT command.

Format: <TCG LTC USERBIT SOURCE TALLY>
<USERBIT SOURCE>

1-byte special binary code:
00_h = no userbits; i.e., all set to zero (= default)
01_h = userbits from I/F item PRESET-TABLE USERBIT SOURCE LTC, which may be preset by a PRESET command
02_h = userbits from external, unspecified source
03_h = userbits continuously copied from the LTC time code from tape (also contained in I/F field USERBITS FROM TAPE LTC
04_h = userbits continuously copied from the VITC time code from tape (also contained in I/F field USERBITS FROM TAPE VITC

57 TCG VITC USERBIT SOURCE TALLY — Tallies the status of the time code generator for the vertical interval time code selected by the TCG VITC UB SOURCE SELECT command.

Format: <TCG VITC USERBIT SOURCE TALLY>
<USERBIT SOURCE>

1-byte special binary code:
00_h = no userbits, i.e., all set to 0 (= default)
01_h = userbits from I/F item PRESET-TABLE USERBIT SOURCE VITC, which may be preset by a PRESET command.
02_h = userbits from external, unspecified source
03_h = userbits continuously copied from the VITC time code from tape (also contained in I/F field USERBITS FROM TAPE VITC)
04_h = userbits continuously copied from the LTC time code from tape (also contained in I/F field USERBITS FROM TAPE LTC)

58 not used

59 not used

5A TAPELENGTH — Contains the length of the loaded tape.

Format: <TAPELENGTH>
<TIME VALUE> — Standard “time” format.

5B PARKING ACCURACY — Contains a time value that determines the accuracy of parking processes performed by certain commands, e.g., TARGET SEARCH, PREROLL SEARCH.

Format: <PARKING ACCURACY>
<FIELDS> — 1-byte unsigned number

NOTE – FF_h (as locally specified) shall be used in the PRESET command only. It shall not be used in an I/F ITEM RESPONSE.

5C SYNCHRONISM ACCURACY — Contains a time value that determines the accuracy of synchronizing processes, i.e., it specifies the maximum allowed offset error at the SYNC POINT.

Format: <SYNCHRONISM ACCURACY>
<FIELDS> — 1-byte unsigned number

NOTE – FF_h (as locally specified) shall be used in the PRESET command only. It shall not be used in an I/F ITEM RESPONSE.

5D not used

5E TRACKING SELECTION TALLY — Tallies the status set by the TRACKING SELECT command.

Format: <TRACKING SELECTION TALLY>
<MODE> — 1-byte special binary code:
00_h = FIXED (default)
01_h = AUTO

5F ANTI-CLOG CONTROL TALLY

Tallies the status of the anti-clog mechanism which is controlled by the ANTI-CLOG CONTROL command.

Format: <ANTI-CLOG CONTROL TALLY>
<SWITCH STATUS>

1-byte special binary code:
00_h = ON (default)
01_h = OFF
02_h = extended
03_h = immediate tension release
FF_h = as selected locally

60 not used

61 TMC TALLY

Tallies the current transport motion command of the VTR and specifies its success at accomplishing the command.

Format: <TMC TALLY>
<KEYWORD>

1-byte value that contains the keyword of the last commanded TMC from either immediate or timeline mode.

<SUCCESS LEVEL>

1-byte special binary code:
00_h = trying; transition in process
01_h = successful
02_h = failure; this tally should be supplemented by an ERROR message as appropriate

62 VELOCITY TALLY

Tallies the current transport velocity. Note that this is the true velocity in all TMC modes.

Format: <VELOCITY TALLY>
<SPEED>

3-byte signed binary number; two's complement scale:
000000_h = still
010000_h = std play speed forward
$7F0000_h$ = approximately 127 times standard play speed forward
$FF0000_h$ = std play speed reverse
800000_h = 128 times standard play speed reverse

NOTE – This is the same coding as in the argument of the VARIABLE PLAY command.

63 TIMELINE CORRECTION TALLY — Tallies the number of fields advanced by the machine internal clock following a TIMELINE RUN command.

Format: <TIMELINE CORRECTION TALLY>
<FIELDS> — 1-byte signed binary number

64 not used

65 PLAYBACK CHANNEL TALLY — Tallies the status of the playback channels selected by the PLAYBACK CHANNEL SELECT command.

Format: <PLAYBACK CHANNEL TALLY>
<CHANNELS> — 3-byte bit mask:
bit 0 (LSB) = video
bit 1 = sync track
bit 2 = VITC
bit 3 = cue audio
bit 4 = reserved
bit 5 = reserved
bit 6 = reserved
bit 7 = LTC
bits 8–23 = audios 1–16 respectively

logic: 0 = playback channel
1 = monitor channel (audio)
record channel (video)

NOTE – Bits 0–7 form the least significant byte; this byte is transmitted last.

66 CHANNEL MUTE TALLY — Tallies the status of the auto mute function selected by the CHANNEL MUTE SELECT command.

Format: <CHANNEL MUTE TALLY>
<CHANNELS> — 3-byte bit mask:
bit 0 (LSB) = video
bit 1 = sync track
bit 2 = VITC
bit 3 = cue audio
bit 4 = reserved
bit 5 = reserved
bit 6 = reserved
bit 7 = LTC
bits 8–23 = audios 1–16 respectively

logic: 0 = mute enabled
1 = mute disabled

NOTE – Bits 0–7 form the least significant byte; this byte is transmitted last.

67 TAPE/EE TALLY

Tallies the status of the tape/electronics switches controlled by the TAPE/EE SELECT command.

Format: <TAPE/EE>
<MODE>

1-byte special binary code:
00_h = auto
01_h = tape
02_h = EE

68 TIME CODE TO TAPE LTC

Contains the current longitudinal time code value being generated by the time code generator.

Format: <TIME CODE TO TAPE LTC>
<TIME VALUE>

Standard “time” format.

69 TIME CODE TO TAPE VITC

Contains the current vertical interval time code value being generated by the time code generator

Format: <TIME CODE TO TAPE VITC>
<TIME VALUE>

Standard “time” format.

6A USERBITS TO TAPE LTC

Contains the current userbit contents being generated by the time code generator to go with the longitudinal time code.

Format: <USERBITS TO TAPE LTC>
<UB SPECIFICATION>
<UB GROUP 8/UB GROUP 7>
<UB GROUP 6/UB GROUP 5>
<UB GROUP 4/UB GROUP 3>
<UB GROUP 2/UB GROUP 1>

For format description, see USERBITS FROM TAPE LTC.

6B USERBITS TO TAPE VITC

Contains the current userbit contents being generated by the time code generator to go with the vertical interval time code.

Format: <USERBITS TO TAPE VITC>
<UB SPECIFICATION>
<UB GROUP 8/UB GROUP 7>
<UB GROUP 6/UB GROUP 5>
<UB GROUP 4/UB GROUP 3>
<UB GROUP 2/UB GROUP 1>

For format description, see USERBITS FROM TAPE LTC.

6C PRESETTABLE TIME SOURCE LTC — Contains a time value that can be PRESET and used to start the LTC time code generator by selecting it in a TCG LTC TIME SOURCE SELECT command.

Format: <PRESETTABLE TIME SOURCE LTC>
<TIME VALUE> — Standard “time” format.

6D PRESETTABLE TIME SOURCE VITC — Contains a time value that can be PRESET and used to start the VITC time code generator by selecting it in a TCG VITC TIME SOURCE SELECT command.

Format: <PRESETTABLE TIME SOURCE VITC>
<TIME VALUE> — Standard “time” format.

6E PRESETTABLE UB SOURCE LTC — Contains a userbit pattern that can be PRESET and used by the LTC time code generator by selecting it in a TCG LTC UB SOURCE SELECT command.

Format: <PRESETTABLE UB SOURCE LTC>
<UB SPECIFICATION> — For format description, see USERBITS FROM TAPE LTC.
<UB GROUP 8/UB GROUP 7>
<UB GROUP 6/UB GROUP 5>
<UB GROUP 4/UB GROUP 3>
<UB GROUP 2/UB GROUP 1>

6F PRESETTABLE UB SOURCE VITC — Contains a userbit pattern that can be PRESET and used by the VITC time code generator by selecting it in a TCG VITC UB SOURCE SELECT command.

Format: <PRESETTABLE UB SOURCE VITC>
<UB SPECIFICATION> — For format description, see USERBITS FROM TAPE LTC.
<UB GROUP 8/UB GROUP 7>
<UB GROUP 6/UB GROUP 5>
<UB GROUP 4/UB GROUP 3>
<UB GROUP 2/UB GROUP 1>

Annex A (informative)
General concepts

The following text contains a general explanation of some of the concepts used in the formulation of the VTR type-specific message set. It constitutes tutorial information and is intended to assist in the understanding of the specifications in previous portions of this document.

A.1 Transport machine states

The transport mechanism of a VTR is considered to be a separate state machine. Therefore, the commands which control transport functions form a subset within the VTR-specific message set. These commands are called tape motion commands (TMCs). Each TMC causes a transition into a transport state and cancels the previous state; i.e., these functions are mutually exclusive.

TMCs include: STOP, STD PLAY, SHUTTLE, PREROLL SEARCH, SYNC, etc.

All tape motion commands are marked as such in the command description.

A.2 Electrical machine states

Other VTR commands affect states of the electrical environment of the VTR. The functions controlled by them are not necessarily mutually exclusive.

A.3 Transport speeds

Some commands require a speed specification which is carried by the command in the form of a 3-byte parameter. This parameter is intended to define the direction and absolute value of the desired speed that should be achieved as closely as possible by the real machine.

All commands with a speed parameter use the same format and coding. This is a 3-byte signed number with a scale range defined so that:

000000_h represents still;
010000_h represents standard play speed forward;
$7F0000_h$ represents approximately 127 times standard play speed forward;
$FF0000_h$ represents standard play speed reverse;
800000_h represents 128 times standard play speed reverse.

It allows theoretically for speeds between --128 and +127 times standard speed and a resolution of 1/65,536th of standard speed.

A.4 Record control

The recording function of the tape machine is fully controlled by the command pair ENTRY/EXIT. The form of record entry or exit is predefined by the command RECORD MODE. The tracks/channels affected by the command are defined by a parameter contained within the ENTRY/EXIT command.

Provision is also made for the rehearsal of an impending recording operation, provided the VTR possesses a mechanism for this purpose, such as tape/EE switching. In this case, the channels affected will also be defined via the ENTRY/EXIT command, but in rehearsal mode this command should control the VTR's rehearsal mechanism rather than placing its channels into and/or out of record.

To ensure that a rehearsal always matches the recording that is to follow, it is recommended as good practice that the track selection be asserted during every rehearsal, and not just during actual recordings. This will be particularly important when the controlling device has just been placed into a different record mode, for example, if it has been switched from insert mode to assemble-all-channels mode. The required channel combination may well be different in the new mode so it must be asserted even before the first recording is made following the mode change. As another variant, when rehearsing an impending read-before-write edit recording, it may prove necessary to set all channels to the "off" condition, to prevent feedback or oscillation occurring during the interval between entry and exit points.

A.5 Track and channel selection

Some commands and information fields refer to one or more tracks (or the associated channels) of the tape machine. The format used is the same in all cases and is defined in the description of the ENTRY and EXIT commands. The format allows for up to 16 audio tracks for future applications.

A.6 VTR information fields

The VTR dialect makes extensive use of the information field concept. Some specific items of the VTR information field are described in the following sections:

A.6.1 TMC tallies

This information field indicates the current state of the transport. As all possible states are commanded by TMCs, the code of the corresponding TMC keyword is used to identify them individually.

An additional byte tallies the level of success; i.e., whether the commanded function is still in progress or already finished, and whether successfully or not.

A.6.2 Other command tallies

Commands which cause changes in any electrical machine state (non-TMCs) have a corresponding information field. When the information field is read, the response is tallied in the same format as that of the command.

Example: The command RECORD MODE is intended to preset the state of the recording electronics. The information field RECORD MODE may be read to obtain information about the record mode status, which will be tallied in the same format as that contained within the RECORD MODE command itself.

A.6.3 Tape code

There are several sources that may be used to identify a tape position, for example:

-- longitudinal time code;
-- vertical interval time code;
-- tape timer 1;
-- tape timer 2.

For tape search, editing, and other automatic procedures, one of these sources must be used. The selected source is referred to as the TAPE CODE, and can be chosen by the TAPE CODE SELECT command. The functions mentioned above then refer to the TAPE CODE rather than directly to time code.

There is a separate information field for each of the codes and timers mentioned above; the tape code actually selected, however, can also be read from the information field TAPE CODE.

A.7 Synchronization

Synchronization is one of the fundamental requirements of a tape machine. Synchronization means that the machine is programmed to pass:

– a specified point on the tape (where);
– at a specified point in time (when);
– locked to a specified speed (how).

Where: The point on the tape is called the SYNC POINT. It is specified in terms of TAPE CODE and is maintained in the information field SYNC POINT. The sync point is specified by applying a PRESET command to this information field.

When: The point in time is defined by the instant of issue of the SYNC command. At a specified time period after the arrival of the SYNC command, the SYNC POINT must be reached. This time period is called the PREROLL DURATION; it is maintained in the information field PREROLL DURATION and is specified by applying a PRESET command to this information field.

Note that the PREROLL DURATION is reserved mainly for synchronization purposes; a greater PREROLL DURATION than required by the real machine may, however, be chosen for operational reasons (e.g., extended preview time).

How: The speed at the sync point is defined by a value maintained in the information field SYNC VELOCITY; it is specified by applying a PRESET command to this information field.

As a prerequisite for the use of the SYNC command, the tape must be placed at a park position which is calculated from the SYNC POINT and the SYNC VELOCITY as follows:

SYNC POINT -- (PREROLL DURATION × STD VELOCITY / SYNC VELOCITY)

To achieve this park position, the PREROLL SEARCH command is used and the VTR virtual machine must make the calculation automatically.

A.7.1 SYNC command from viewpoint of an ideal machine

A better understanding of the function of the SYNC command can be had if it is considered from the viewpoint of an “ideal” machine:

– On the arrival of a SYNC command, an ideal VTR would start immediately with no delay, fully locked and with the specified speed. Under these ideal conditions, the machine would, at the PREROLL DURATION time later, be precisely at the SYNC POINT.

– A real VTR cannot start and synchronize immediately; it is, therefore, the responsibility of the virtual machine and the virtual machine manufacturer to control the real machine in such a manner that the result is the same.

Measures taken in order to correct synchronization following the preroll duration period may include:

– on the receipt of a PREROLL SEARCH command, parking a few frames down the tape to match the average number of frames lost while coming up to play speed;

– on the SYNC command, overriding the specified velocity using the tape speed override facility of the real machine to eliminate the remaining offset from the appropriate lock condition.

A.7.2 CHASE command: alternative means of maintaining synchronism

While the PREROLL SEARCH/SYNC commands may be used to run several machines in continuous synchronism (without changing their states and/or speed), the CHASE command is used to maintain synchronism as closely as possible where dynamic changes of the machines’ state and/or speed occur.

This operation, however, requires one of the synchronous machines to be the “master” while the others perform as “slaves” and emulate all the movements of the master, even when in the SHUTTLE state.

The slaves must, therefore, be given precise information about the movement of the master. Such information is, in general, transferred by means of time code, which is distributed continuously from the master to all slaves over a separate line. The bus cannot be used for this purpose due to its unpredictable delays.

The CHASE command specifies an offset between the time code of the chasing machine and a reference. The reference is the timeline which, in this case, will usually be programmed to use an “external reference time” as its source; i.e., the time code of the master. (See also the common message TIMELINE SOURCE.)

A.8 Immediate and timeline modes

All VTR commands can be used in the “immediate mode” which causes their instantaneous execution. In this way, they can be used to control even time-critical functions. As the transfer of a message over the bus within a given time slot cannot be guaranteed, however, the immediate mode is not recommended for such applications.

Wherever possible, time-critical commands should be queued on the timeline, using the command facilities provided by the common message set. Activities requiring synchronous operations between several VTRs are best suited to the "timeline mode'' of operation which allows for the preprogramming of sequences of time-critical functions (e.g., SYNC, ENTRY, and EXIT commands). All time-critical functions refer to the timelines of the individual virtual machines, which themselves are synchronized by a system time transmission from the bus controller in response to a REQUEST TIME TRANSMISSION command.

For certain time-critical applications (like editing), it is essential that all machine internal clocks are synchronized to the station field phase sequence. In order to achieve this phasing, the machine internal clock will be ADVANCED by as many frames as necessary following receipt of the TIMELINE RUN command. When all virtual machines in a session achieve this in the same way (for example, when they are all VTRs), there is no difficulty.

However, a problem does arise if there are non-VTR participants within a session (ATRs for example). They would have no reason to advance the machine internal clock in accordance with a video sequence; therefore, a mixed operation of VTRs and non-VTRs would not necessarily run synchronously.

There are two approaches which might be taken to resolve this problem:

– If the bus clock which resides in the bus controller runs synchronously with the video field phase sequence, no correction of a machine internal clock following a TIMELINE RUN command need take place.

– Alternatively, if this approach is not possible, the controlling device may obtain information about correction of any of the clocks within the system by READing the information field TIMELINE CORRECTION TALLY from all virtual machines involved and comparing them with each other; if this results in differing tallies, the controlling device can take that into account when calculating events for the timeline.

In the case of a known synchronous bus clock, the TIMELINE CORRECTION TALLY may be used by the controlling device for fault diagnosis on the machine internal clocks.

A.9 Sample command sequences

The following sections show samples of typical command sequences in immediate mode as well as in timeline mode. These sequences describe only some of the applications of the command set. There is no obligation on the part of system designers to use precisely these sequences.

A.9.1 Immediate mode

A.9.1.1 Search and play

Some time before initial action:

<PRESET> <PREROLL DURATION> <time value>
<PRESET> <SYNC POINT> <time value>

Initial action:

<PREROLL SEARCH>

Final action (not earlier than when the TMC TALLY has been "SEARCHed successfully"):

<STD PLAY>

On the STD PLAY command, the VTR starts and reaches the sync point APPROXIMATELY after the preroll duration.

If the VTR is required to start at the sync point location (using no preroll), the TARGET SEARCH command should be used. Synchronization is not then guaranteed.

Note that the preroll duration and the sync point, once loaded, need not be reloaded until changed.

A.9.1.2 Search and synchronize

Some time before initial action:

<PRESET> <PREROLL DURATION> <time value>
<PRESET> <SYNC POINT> <time value>
<PRESET> <SYNC VELOCITY> <speed value>

Inital action:

<PREROLL SEARCH>

Final action (not earlier than when the TMC TALLY has been "SEARCHed successfully"):

<SYNC>

On the SYNC command, the VTR starts and reaches the sync point PRECISELY after the preroll duration.

Under control of the virtual machine, the TAPE SPEED OVERRIDE function of the VTR may be used to find the appropriate lock. Synchronization of the VTR in response to the SYNC command is guaranteed; however:

– In PAL, the VTR will be advanced by one frame when necessary to be in accordance with the P-phase;

– The color framer may advance the VTR by as many frames as necessary.

This sequence can be used for the synchronous operation of multiple VTRs only when delivery of the SYNC command can be guaranteed within a reasonable time slot (e.g., one field).

Note that the preroll duration, once loaded, need not be reloaded until changed.

A.9.1.3 Search, synchronize, and insert edit

Some time before initial action:

<PRESET> <PREROLL DURATION> <time value>
<PRESET> <SYNC POINT> <time value>
<PRESET> <SYNC VELOCITY> <speed value>
<RECORD MODE> <"insert">

Initial action:

<PREROLL SEARCH>

Final action (not earlier than when the TMC TALLY has been "SEARCHed successfully"):

<SYNC>

at ("entry point" — "record delay"):

<ENTRY> <appropriate channels>

at ("exit point" — "record delay"):

<EXIT> <appropriate channels>

The controlling virtual machine must "know" the record delays of the VTRs and correct for them.

In "assemble" mode, edits and previews differ only in the RECORD MODE parameter.

This sequence can be used for the synchronous operation of multiple VTRs only on the condition that the transfer of the SYNC, ENTRY, and EXIT commands is guaranteed within a reasonable time slot (e.g., one field).

A.9.2 Timeline mode

A.9.2.1 Search and play

Some time before initial action:

<PRESET> <PREROLL DURATION> <time value>
<CLEAR EVENT> <0>
<STOP TIMELINE> (optional)
<PRESET> <SYNC POINT> <time value>
<PRESET> <SYNC VELOCITY> <speed value>

Initial action:

<PREROLL SEARCH>

Final action (not earlier than when the TMC TALLY has been "SEARCHed successfully"):

<REQUEST TIME TRANSMISSION>
<DEFINE EVENT>
<TIMELINE> <"timeline sync point" – "preroll duration">
<STD PLAY>

Note that the "timeline sync point" is the value of the timeline when the sync point has been reached APPROXIMATELY. It must be calculated from the instantaneous timeline value transmitted by the bus controller in response to the preceding REQUEST TIME TRANSMISSION command. In this case, it is actually easier to use the immediate mode which allows for VTR PLAY at a specific time from commands given much earlier.

A.9.2.2 Search and synchronize

Some time before initial action:

<PRESET> <PREROLL DURATION> <time value>
<CLEAR EVENT> <0>
<STOP TIMELINE> (optional)
<PRESET> <SYNC POINT> <time value>
<PRESET> <SYNC VELOCITY> <speed value>

Initial action:

<PREROLL SEARCH>

Final action (not earlier than when the TMC TALLY has been "SEARCHed successively"):

<REQUEST TIME TRANSMISSION>
<DEFINE EVENT>
<TIMELINE> <"timeline sync point" – "preroll duration">
<SYNC>

Note that the "timeline sync point" is the value of the timeline when the sync point has been reached PRECISELY. It must be calculated from the instantaneous timeline value transmitted by the bus controller in response to the preceding REQUEST TIME TRANSMISSION command. For editing, it is generally desirable to introduce no unnecessary waiting times; therefore, it is suggested that:

(timeline sync point – preroll duration)

be substituted in the DEFINE EVENT command by:

(instantaneous timeline value + some frames to compensate for transmission delay).

It is the responsibility of the controlling virtual machine to ensure that the SYNC command is placed on the timeline at a point such that the SYNC POINT and the timeline SYNC POINT coincide in respect to the color framer and/or the P-phase (in PAL). If this is not done, the situation described in A.9.1.2 will occur, which may result in inexact edits. This implies preference for a system in which the system time, which presets all timelines, is synchronized to reference color frame (or in PAL, at least to P-phase).

A.9.2.3 Search, synchronize, and insert edit

Some time before initial action:

<PRESET> <PREROLL DURATION> <time value>
<CLEAR EVENT> <0>
<STOP TIMELINE> (optional)
<PRESET> <SYNC POINT> <time value>
<PRESET> <SYNC VELOCITY> <speed value>
<RECORD MODE> <"insert">

Initial action:

<PREROLL SEARCH>

Final action (not earlier than when the TMC TALLY has been "SEARCHed successfully"):

<REQUEST TIME TRANSMISSION>
<DEFINE EVENT>
<TIMELINE> <"timeline sync point" – "preroll duration">
<SYNC>
<DEFINE EVENT>
<TIMELINE> <required timeline value>
<ENTRY> <appropriate channels>

<DEFINE EVENT>
<TIMELINE> <required timeline value>
<EXIT> <appropriate channels>

The VTR virtual machine is responsible for the compensation of any inherent delays, so that the functions called for happen on the designated field. This allows the controlling virtual machine to talk to the VTR in a generic fashion. Thus, type C, type B, U-matic, and quad VTRs will all be set by exactly the same commands, and will all edit on the same field.

Split edits require multiple ENTRY and/or EXIT commands stacked on different points of the timeline by using multiple DEFINE EVENT commands.

In “assemble” mode, edits and previews differ only in the RECORD MODE parameter.

Annex B (informative)
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