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Enhancements to the AV/C Tape Recorder/Player Subunit Specification Version 2.1

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Abstract:
This specification adds optional NOTIFY commands to the INPUT SIGNAL MODE and OUTPUT SIGNAL MODE commands of the AV/C Tape Recorder/Player Subunit Specification Version 2.1.

Keywords:
Audio, Video, Tape Recorder/Player, 1394, Digital, Interface.

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Editor, 1394 Trade Association
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1. Overview

1.1 Purpose

This document describes some enhancements to the INPUT SIGNAL MODE command and OUTPUT SIGNAL MODE commands of the AV/C Tape Recorder/Player Subunit Specification, Version 2.1. The effect is to add a NOTIFY status to these commands so that a controller of the Tape Recorder/Player Subunit can be notified when there is a change in the status of these two modes.

This document should be read in conjunction with the AV/C Tape Recorder/Player Subunit Specification, Version 2.1, Ref [1]

1.2 Scope

This document makes changes only to the INPUT SIGNAL MODE command and OUTPUT SIGNAL MODE commands. Only those sections that are changed by this proposal are described here. Note that section number in this document refer to the section numbers in the base AV/C Tape Recorder/Player Subunit Specification, Version 2.1.

2. References

The following standards contain provisions, which through reference in this document, constitute provisions of this standard. All the standards listed are normative references. Informative references are given in Annex A. 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 editions of the standards indicated below.

Note that the Reference numbering in this document refers to the Reference numbering in the base AV/C Tape Recorder/Player Subunit Specification, Version 2.1.

[1] AV/C Tape recorder/player Subunit Specification, Version 2.1, January 11th, 1999

[6] IEC-61834, Recording – Helical-scan digital video cassette recording system using 6,35 mm magnetic tape for consumer use (1998-08)

[7] 8mm Video Conference c/o Electronic Industries Association of Japan, HELICAL-SCAN VIDEO TAPE CASSETTE SYSTEM USING 8mm MAGNETIC TAPE KNOWN AS 8mm VIDEO (April 1984)

[11] Victor Company of Japan, Limited (JVC), VHS VIDEO CASSETTE SYSTEM STANDARD

[12] Victor Company of Japan, Limited (JVC), S-VHS VIDEO CASSETTE SYSTEM STANDARD

3. Definitions

3.1 Conformance levels

3.1.1 expected: A key word used to describe the behavior of the hardware or software in the design models *assumed* by this Specification. Other hardware and software design models may also be implemented.

3.1.2 may: A key word that indicates flexibility of choice with *no implied preference*.

3.1.3 shall: A key word indicating a mandatory requirement. Designers are *required* to implement all such mandatory requirements.

3.1.4 should: A key word indicating flexibility of choice with a strongly preferred alternative. Equivalent to the phrase *is recommended*.

3.1.5 reserved codes: A set of codes for a reserved field that are defined in this specification, but not otherwise used. Future specifications may implement the use of these codes. A product implementing this specification shall not generate, nor receive these codes.

3.1.6 reserved fields: A set of bits for a reserved field that are defined in this specification, but are not otherwise used. Products that implement this specification shall zero these fields and shall not check the reserved field's value. Products that implement future revisions of this specification may set these codes as defined by the specification.

NOTE — The IEEE is investigating whether the "may, shall, should" and possibly "expected" terms will be formally defined by IEEE. If and when this occurs, draft editors should obtain their conformance definitions from the latest IEEE style document.

3.2 Glossary of terms

3.2.1 byte: Eight bits of data, used as a synonym for octet.

3.3 Acronyms and abbreviations

AV/C Audio Video Controller

4. Tape Recorder/Player Subunit Commands

Tape recorder/player subunit commands are identified by a *subunit_type* value of four and a *subunit_ID* value between zero and seven, inclusive. Table 4-1 below summarizes the Tape recorder/player subunit commands.

Table 4-1— Tape recorder/player subunit commands

Opcode	Value	Support level (by *ctype*) C	S	N	Comments
ANALOG AUDIO OUTPUT MODE	70_{16}	O	O	–	Control analog audio signal
AREA MODE	72_{16}	O	O	–	Control command specifies the area on the medium for input signal(s) to be recorded
ABSOLUTE TRACK NUMBER	52_{16}	*	*	–	Report tape position
AUDIO MODE	71_{16}	O	O	–	Control audio signal recording mode
BACKWARD	56_{16}	R	–	–	Search for a tape position
BINARY GROUP	$5A_{16}$	O	O	O	Reads or writes the binary group preset data, reads the binary group data from the medium.
EDIT MODE	40_{16}	O	O	–	Control editing operations prior to an anticipated playback or record command
FORWARD	55_{16}	R	–	–	Search for a tape position
INPUT SIGNAL MODE	79_{16}	O	M	O	Control input signal mode
LOAD MEDIUM	$C1_{16}$	O	–	–	Control eject, open and close
MARKER	CA_{16}	R	R	O	Record or erase a marker signal
MEDIUM INFO	DA_{16}	–	R	–	Report medium information
OPEN MIC	60_{16}	*	R	–	Open or close MIC
OUTPUT SIGNAL MODE	78_{16}	O	M	O	Control output signal mode
PLAY	$C3_{16}$	*	–	–	Control the playback mode of the transport mechanism
PRESET	45_{16}	O	O	–	Establish operating parameters for the transport mechanism
READ MIC	61_{16}	R	–	–	Read data from MIC
RECORD	$C2_{16}$	*	–	–	Control the recording mode of the transport mechanism

Table 4-2— Tape recorder/player subunit commands(continued)

Opcode	Value	Support level (by *ctype*) C	S	N	Comments
RECORDING DATE	**53_{16}**	O	O	–	Report recording date
RECORDING SPEED	**DB_{16}**	O	O	–	Control recording speed
RECORDING TIME	**54_{16}**	–	O	–	Report recording time
RELATIVE TIME COUNTER	**57_{16}**	R	R	–	Search, inquire or clear the RTC value
SEARCH MODE	**50_{16}**	–	R	O	Report transport mechanism search mode status
SMPTE/EBU RECORDING TIME	**$5C_{16}$**	O	O	O	Reads or writes the preset recording time, reads the recording time from the medium. Uses the SMPTE/EBU time code format.
SMPTE/EBU TIME CODE	**59_{16}**	O	O	O	Reads or writes the preset time code, reads the time code from the medium. Uses the SMPTE/EBU time code format.
TAPE PLAYBACK FORMAT	**$D3_{16}$**	*	*	–	Specifies the digital playback format
TAPE RECORDING FORMAT	**$D2_{16}$**	*	*	–	Specifies the digital record format
TIME CODE	**51_{16}**	*	*	–	Search or inquire about specified medium location
TRANSPORT STATE	**$D0_{16}$**	–	M	O	Report current state of transport mechanism
WIND	**$C4_{16}$**	*	–	–	Control transport mechanism motion when not in playback or record
WRITE MIC	**62_{16}**	O	O	–	Store data in MIC

In the preceding tables, a dash in the support level column indicates that the command is not defined for the *ctype* value, CONTROL, STATUS or NOTIFY, indicated. An asterisk in the support level column indicates that the command operands or the type of subunit determine whether the command is mandatory (M), recommended (R) or optional (O). The specific command formats and corresponding response frame formats are described for each of the commands in the clauses that follow.

4.29 INPUT SIGNAL MODE Command

The INPUT SIGNAL MODE control command configures a Tape recorder/player subunit to accept its input data in one of the formats defined by the DVCR, D-VHS, S-VHS, VHS, or 8mm Specifications. The structure of the INPUT SIGNAL MODE command is shown in Figure 4-20 below.

	msb							lsb
opcode	INPUT SIGNAL MODE (79_{16})							
operand[0]	signal_mode							

Figure 4-20— INPUT SIGNAL MODE control command format

The signal_mode field specifies the characteristics of the input data, as defined by the table that follows:

Table 4-18 —Signal modes

Value	Signal mode	Reference
00_{16}	SD 525-60	DVCR Specification [6]
04_{16}	SDL 525-60	
08_{16}	HD 1125-60	
80_{16}	SD 625-50	
84_{16}	SDL 625-50	
88_{16}	HD 1250-50	
10_{16}	MPEG 25Mbps-60	
14_{16}	MPEG 12.5Mbps-60	
18_{16}	MPEG 6.25Mbps-60	
90_{16}	MPEG 25Mbps-50	
94_{16}	MPEG 12.5Mbps-50	
98_{16}	MPEG 6.25Mbps-50	
01_{16}	D-VHS Digital	D-VHS STANDARD [10]
05_{16}	Analog VHS NTSC 525/60	VHS STANDARD [11]
25_{16}	Analog VHS M-PAL 525/60	
$A5_{16}$	Analog VHS PAL 625/50	
$B5_{16}$	Analog VHS N-PAL 625/50	
$C5_{16}$	Analog VHS SECAM 625/50	
$D5_{16}$	Analog VHS ME-SECAM 625/50	
$0D_{16}$	Analog S-VHS 525/60	S-VHS STANDARD [12]
ED_{16}	Analog S-VHS 625/50	
06_{16}	Analog 8mm NTSC	8mm Specification [7]
86_{16}	Analog 8mm PAL	
$0E_{16}$	Analog Hi8 NTSC	
$8E_{16}$	Analog Hi8 PAL	

The INPUT SIGNAL MODE command may also be used to query which signal format the Tape recorder/player subunit is currently configured to accept. In this case the ctype field shall be STATUS and the command format illustrated by Figure 4-21 below is used.

	msb							lsb
opcode	INPUT SIGNAL MODE (79_{16})							
operand[0]	FF_{16}							

Figure 4-21— INPUT SIGNAL MODE status command format

The AV/C response frame returned by the Tape recorder/player subunit updates operand[0] with one of the values described in Table 4-18 above.

The INPUT SIGNAL MODE command may also be used as a notify command. The notify command has the same syntax as the status command, but with a ctype of NOTIFY. A notification shall be returned by the target to the controller that issued the notify command when there is a change in the configuration of input signal mode of the VCR subunit. The notify response has the same format as the status response frame.

OUTPUT SIGNAL MODE Command

The OUTPUT SIGNAL MODE control command configures a Tape recorder/player subunit to transmit its output data in one of the formats defined by the HD Digital VCR Conference or defined by the D-VHS, S-VHS, and VHS Specifications. The structure of the OUTPUT SIGNAL MODE command is shown in Figure 4-22 below.

	msb							lsb
opcode	OUTPUT SIGNAL MODE (78_{16})							
operand[0]	signal_mode							

Figure 4-22 — OUTPUT SIGNAL MODE control command format

The *signal_mode* field specifies the characteristics of the output data, as defined by Table 4-18.

The OUTPUT SIGNAL MODE command may also be used to query which signal format the Tape recorder/player subunit is currently configured to transmit. In this case the *ctype* field shall be STATUS and the command format illustrated by Figure 4-23 below is used.

	msb							lsb
opcode	OUTPUT SIGNAL MODE (78_{16})							
operand[0]	FF_{16}							

Figure 4-23 — OUTPUT SIGNAL MODE status command format

The AV/C response frame returned by the Tape recorder/player subunit updates *operand[0]* with one of the values described in Table 4-18 above.

The OUTPUT SIGNAL MODE command may also be used as a notify command. The notify command has the same syntax as the status command, but with a ctype of NOTIFY. A notification shall be returned by the target to the controller that issued the notify command when there is a change in the configuration of output signal mode of the VCR subunit. The notify response has the same format as the status response frame.

Annexes

Annex A: AV/C Tape recorder/player subunit commands in numerical order (normative)

The table below lists the AV/C Tape recorder/player commands, in numerical order by *opcode*.

Table A-19 — Tape recorder/player subunit commands

Value	Opcode	Support level (by *ctype*)		
		C	S	N
40_{16}	EDIT MODE	O	O	–
45_{16}	PRESET	O	O	–
50_{16}	SEARCH MODE	–	R	O
51_{16}	TIME CODE	*	*	–
52_{16}	ABSOLUTE TRACK NUMBER	*	*	–
53_{16}	RECORDING DATE	O	O	–
54_{16}	RECORDING TIME	–	O	–
55_{16}	FORWARD	R	–	–
56_{16}	BACKWARD	R	–	–
57_{16}	RELATIVE TIME COUNTER	R	R	–
59_{16}	SMPTE/EBU TIME CODE	O	O	O
$5A_{16}$	BINARY GROUP	O	O	O
$5C_{16}$	SMPTE/EBU RECORDING TIME	O	O	O
60_{16}	OPEN MIC	*	R	–
61_{16}	READ MIC	R	–	–
62_{16}	WRITE MIC	O	O	–
70_{16}	ANALOG AUDIO OUTPUT MODE	O	O	–
71_{16}	AUDIO MODE	O	O	–
72_{16}	AREA MODE	O	O	–
78_{16}	OUTPUT SIGNAL MODE	O	M	O
79_{16}	INPUT SIGNAL MODE	O	M	O
$C1_{16}$	LOAD MEDIUM	O	–	–
$C2_{16}$	RECORD	*	–	–
$C3_{16}$	PLAY	*	–	–
$C4_{16}$	WIND	*	–	–
CA_{16}	MARKER	R	R	O
$D0_{16}$	TRANSPORT STATE	–	M	O
$D2_{16}$	TAPE RECORDING FORMAT	*	*	–
$D3_{16}$	TAPE PLAYBACK FORMAT	*	*	–
DA_{16}	MEDIUM INFO	–	R	–
DB_{16}	RECORDING SPEED	O	O	–

In the preceding table, an asterisk in the support level column indicates that the command operands or the type of subunit determine whether the command is mandatory (M), recommended (R) or optional (O).