

ISO/IEC 29341-4-10:2008-11 (E)

Information technology_ - UPnP Device Architecture_ - Part_4-10: Audio Video Device Control Protocol_ - Level 2_ - Audio Video Transport Service

CONTENTS

FOREWORD	7
ORIGINAL UPNP DOCUMENTS (informative)	9
1 Overview and Scope	11
1.1 Introduction	11
1.2 Notation	11
1.2.1 Data Types	11
1.2.2 Strings Embedded in Other Strings	12
1.2.3 Extended Backus-Naur Form	12
1.3 Derived Data Types	13
1.3.1 Comma Separated Value (CSV) Lists	13
1.4 Management of XML Namespaces in Standardized DCPs	14
1.4.1 Namespace Prefix Requirements	17
1.4.2 Namespace Names, Namespace Versioning and Schema Versioning	18
1.4.3 Namespace Usage Examples	19
1.5 Vendor-defined Extensions	19
1.6 References	20
2 Service Modeling Definitions	23
2.1 ServiceType	23
2.2 State Variables	23
2.2.1 <u>TransportState</u>	28
2.2.2 <u>TransportStatus</u>	28
2.2.3 <u>CurrentMediaCategory</u>	28
2.2.4 <u>PlaybackStorageMedium</u>	29
2.2.5 <u>RecordStorageMedium</u>	29
2.2.6 <u>PossiblePlaybackStorageMedia</u>	29
2.2.7 <u>PossibleRecordStorageMedia</u>	29
2.2.8 <u>CurrentPlayMode</u>	29
2.2.9 <u>TransportPlaySpeed</u>	29
2.2.10 <u>RecordMediumWriteStatus</u>	29
2.2.11 <u>CurrentRecordQualityMode</u>	29
2.2.12 <u>PossibleRecordQualityModes</u>	30
2.2.13 <u>NumberOfTracks</u>	30
2.2.14 <u>CurrentTrack</u>	30
2.2.15 <u>CurrentTrackDuration</u>	30
2.2.16 <u>CurrentMediaDuration</u>	31
2.2.17 <u>CurrentTrackMetaData</u>	31
2.2.18 <u>CurrentTrackURI</u>	31
2.2.19 <u>AVTransportURI</u>	31
2.2.20 <u>AVTransportURIMetaData</u>	31
2.2.21 <u>NextAVTransportURI</u>	31
2.2.22 <u>NextAVTransportURIMetaData</u>	32
2.2.23 <u>RelativeTimePosition</u>	32
2.2.24 <u>AbsoluteTimePosition</u>	32
2.2.25 <u>RelativeCounterPosition</u>	32
2.2.26 <u>AbsoluteCounterPosition</u>	33
2.2.27 <u>CurrentTransportActions</u>	33

2.2.28	<u>LastChange</u>	33
2.2.29	<u>DRMState</u>	33
2.2.30	<u>A_ARG_TYPE SeekMode</u>	34
2.2.31	<u>A_ARG_TYPE SeekTarget</u>	34
2.2.32	<u>A_ARG_TYPE InstanceID</u>	34
2.2.33	<u>A_ARG_TYPE DeviceUDN</u>	34
2.2.34	<u>A_ARG_TYPE ServiceType</u>	35
2.2.35	<u>A_ARG_TYPE ServiceID</u>	35
2.2.36	<u>A_ARG_TYPE StateVariableValuePairs</u>	35
2.2.37	<u>A_ARG_TYPE StateVariableList</u>	35
2.3	Eventing and Moderation	36
2.3.1	Event Model	37
2.4	Actions	38
2.4.1	<u>SetAVTransportURI()</u>	39
2.4.2	<u>SetNextAVTransportURI()</u>	41
2.4.3	<u>GetMediaInfo()</u>	43
2.4.4	<u>GetMediaInfo Ext()</u>	44
2.4.5	<u>GetTransportInfo()</u>	45
2.4.6	<u>GetPositionInfo()</u>	46
2.4.7	<u>GetDeviceCapabilities()</u>	47
2.4.8	<u>GetTransportSettings()</u>	48
2.4.9	<u>Stop()</u>	49
2.4.10	<u>Play()</u>	50
2.4.11	<u>Pause()</u>	52
2.4.12	<u>Record()</u>	52
2.4.13	<u>Seek()</u>	54
2.4.14	<u>Next()</u>	56
2.4.15	<u>Previous()</u>	58
2.4.16	<u>SetPlayMode()</u>	60
2.4.17	<u>SetRecordQualityMode()</u>	61
2.4.18	<u>GetCurrentTransportActions()</u>	62
2.4.19	<u>GetDRMState()</u>	63
2.4.20	<u>GetStateVariables()</u>	64
2.4.21	<u>SetStateVariables()</u>	65
2.4.22	Common Error Codes	66
2.5	Theory of Operation	68
2.5.1	TransportState Control	68
2.5.2	Transport Settings	69
2.5.3	Navigation	69
2.5.4	AVTransportURI Concept	69
2.5.5	AVTransport Abstraction	70
2.5.6	Supporting Multiple Virtual Transports	72
2.5.7	Playlist Playback	73
3	XML Service Description	74
4	Test	89
Annex A	(normative) <u>SetAVTransportURI()</u> Protocol Specifics	90
A.1	Application to HTTP Streaming	90
A.1.1	<u>AVTransportURI</u> Definition	90

A.1.2	Control Point Behavior for <u>SetAVTransportURI()</u>	90
A.1.3	Implementation of <u>SetAVTransportURI()</u>	90
A.1.4	Cleanup	90
A.2	Application to RTSP/RTP/UDP Streaming	90
A.2.1	<u>AVTransportURI</u> Definition	90
A.2.2	Control Point behavior for <u>SetAVTransportURI()</u>	91
A.2.3	Implementation of <u>SetAVTransportURI()</u>	91
A.2.4	Cleanup	91
A.2.5	Implementation of Transport Controls.....	92
A.3	Application to Internal Streaming.....	92
A.3.1	<u>AVTransportURI</u> Definition.....	92
A.3.2	Implementation of <u>SetAVTransportURI()</u>	92
A.3.3	Cleanup	92
A.4	Application to IEC61883 Streaming.....	92
A.4.1	<u>AVTransportURI</u> Definition.....	92
A.4.2	Implementation of <u>SetAVTransportURI()</u>	92
A.4.3	Cleanup	93
A.5	Application to Vendor-specific Streaming.....	93
A.5.1	<u>AVTransportURI</u> Definition.....	93
A.5.2	Implementation of <u>SetAVTransportURI()</u>	93
A.5.3	Cleanup	93

LIST OF TABLES

Table 1-1:	EBNF Operators	12
Table 1-2:	CSV Examples	14
Table 1-3:	Namespace Definitions.....	16
Table 1-4:	Schema-related Information	17
Table 1-5:	Default Namespaces for the AV Specifications	18
Table 2-6:	State Variables	23
Table 2-7:	allowedValueList for <u>TransportState</u>	24
Table 2-8:	allowedValueList for <u>CurrentMediaCategory</u>	24
Table 2-9:	allowedValueList for <u>PlaybackStorageMedium</u> and <u>RecordStorageMedium</u>	25
Table 2-10:	allowedValueList for <u>CurrentPlayMode</u>	26
Table 2-11:	allowedValueList for <u>RecordMediumWriteStatus</u>	26
Table 2-12:	allowedValueList for <u>CurrentRecordQualityMode</u>	26
Table 2-13:	allowedValueRange for <u>NumberOfTracks</u>	26
Table 2-14:	allowedValueRange for <u>CurrentTrack</u>	27
Table 2-15:	allowedValueList for <u>CurrentTransportActions</u>	27
Table 2-16:	allowedValueList for <u>DRMState</u>	27
Table 2-17:	allowedValueList for <u>A_ARG_TYPE_SeekMode</u>	28
Table 2-18:	Format of <u>A_ARG_TYPE_SeekTarget</u>	34
Table 2-19:	Event Moderation.....	36
Table 2-20:	Actions	38
Table 2-21:	Arguments for <u>SetAVTransportURI()</u>	39
Table 2-22:	Error Codes for <u>SetAVTransportURI()</u>	40
Table 2-23:	Arguments for <u>SetNextAVTransportURI()</u>	41
Table 2-24:	Error Codes for <u>SetNextAVTransportURI()</u>	41
Table 2-25:	Arguments for <u>GetMediaInfo()</u>	43
Table 2-26:	Error Codes for <u>GetMediaInfo()</u>	43
Table 2-27:	Arguments for <u>GetMediaInfo_Ext()</u>	44
Table 2-28:	Error Codes for <u>GetMediaInfo_Ext()</u>	44
Table 2-29:	Arguments for <u>GetTransportInfo()</u>	45
Table 2-30:	Error Codes for <u>GetTransportInfo()</u>	45
Table 2-31:	Arguments for <u>GetPositionInfo()</u>	46
Table 2-32:	Error Codes for <u>GetPositionInfo()</u>	46
Table 2-33:	Arguments for <u>GetDeviceCapabilities()</u>	47
Table 2-34:	Error Codes for <u>GetDeviceCapabilities()</u>	47
Table 2-35:	Arguments for <u>GetTransportSettings()</u>	48
Table 2-36:	Error Codes for <u>GetTransportSettings()</u>	48
Table 2-37:	Arguments for <u>Stop()</u>	49
Table 2-38:	Error Codes for <u>Stop()</u>	49
Table 2-39:	Arguments for <u>Play()</u>	50

Table 2-40:	Error Codes for <u>Play()</u>	51
Table 2-41:	Arguments for <u>Pause()</u>	52
Table 2-42:	Error Codes for <u>Pause()</u>	52
Table 2-43:	Arguments for <u>Record()</u>	53
Table 2-44:	Error Codes for <u>Record()</u>	53
Table 2-45:	Arguments for <u>Seek()</u>	54
Table 2-46:	Error Codes for <u>Seek()</u>	55
Table 2-47:	Arguments for <u>Next()</u>	56
Table 2-48:	Error Codes for <u>Next()</u>	57
Table 2-49:	Arguments for <u>Previous()</u>	58
Table 2-50:	Error Codes for <u>Previous()</u>	59
Table 2-51:	Arguments for <u>SetPlayMode()</u>	60
Table 2-52:	Error Codes for <u>SetPlayMode()</u>	60
Table 2-53:	Arguments for <u>SetRecordQualityMode()</u>	61
Table 2-54:	Error Codes for <u>SetRecordQualityMode()</u>	61
Table 2-55:	Arguments for <u>GetCurrentTransportActions()</u>	62
Table 2-56:	Error Codes for <u>GetCurrentTransportActions()</u>	62
Table 2-57:	Arguments for <u>GetDRMState()</u>	63
Table 2-58:	Error Codes for <u>GetDRMState()</u>	63
Table 2-59:	Arguments for <u>GetStateVariables()</u>	64
Table 2-60:	Error Codes for <u>GetStateVariables()</u>	64
Table 2-61:	Arguments for <u>SetStateVariables()</u>	65
Table 2-62:	Error Codes for <u>SetStateVariables()</u>	65
Table 2-63:	Common Error Codes.....	66
Table 2-64:	Allowed AVTransportURIs.....	70
Table 2-65:	Example mappings of resources type to track sequences.....	70
Table 2-66:	Example seek modes, play modes and transport actions, per resource type.....	71

LIST OF FIGURES

Figure 1:	<u>TransportState</u> Transitions - INFORMATIVE.....	68
-----------	--	----