



BASE AUDIO FORMATS FUNCTIONAL & INTEROPERABILITY SPECIFICATION

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1. INTRODUCTION

Professional Audio use cases require the Ethernet-AVB network to transport a common media format.

2. REFERENCES

<i>Name</i>	<i>Reference</i>
AVTP	IEEE 1722-2016, "IEEE Standard for a Transport Protocol for Time-Sensitive Applications in Bridged Local Area Networks".
AVDECC	IEEE 1722.1-2013, "IEEE Standard for Device Discovery, Connection Management, and Control Protocol for IEEE 1722 Based Devices".

3. GLOSSARY

<i>Term</i>	<i>Meaning</i>
AAF	AVTP Audio Format, as defined in AVTP, clause 7.
Base Format Type	A specific format type described in Clause 5 of this document.
Base Format stream	A Stream that complies with the Base Format Type.
CONFIGURATION	An AVDECC operating mode, as described in [AVDECC, Clause 7.1].
Format	The combination of samples per frame, channels per frame, sample rate, bit depth.
Format Type	A set of formats with some common characteristics.
PAAD	A professional audio device with Ethernet AVB functionality compliant to this specification.
PAAD Listener	A PAAD that is capable of receiving audio according to this specification.
PAAD Talker	A PAAD that is capable of transmitting audio according to this specification.
PAAD-AE	The AVDECC Entity under consideration inside the PAAD.

PAAD-AE Base Listener	A PAAD-AE that is capable of receiving a Base Format stream.
PAAD-AE Base Talker	A PAAD-AE that is capable of transmitting a Base Format stream.
Stream	A unidirectional flow of AVTP frames with the same Stream ID.
STREAM_INPUT	An AVDECC descriptor as described in [AVDECC, Clause 7.2.6].
STREAM_OUTPUT	An AVDECC descriptor as described in [AVDECC, Clause 7.2.6].

4. SCOPE

The intent of this document is to define a minimum set of formats for PAAD interoperability.

This specification considers a single AVDECC Entity within a PAAD. If a physical device contains multiple AVDECC Entities, they are viewed as independent PAADs by this specification. The AVDECC Entity under consideration in the PAAD is referred to as the PAAD-AE.

5. BASE FORMAT TYPE

The Base Format Type is designed to achieve interoperability between all PAADs.

The Formats of the Base Format Type use AAF, as defined in AVTP [AVTP, clause 7.3.2], with the following parameters:

- data encapsulation = PCM
- bit depth = 32-bit
- sample rate = SR, where SR is an element from {48 kHz, 96 kHz, 192 kHz}
- number of channels = N, where N is an element from {1, 2, 4, 6, 8}
- Each PDU shall contain NS audio samples per channel and 1 timestamp (normal timestamp mode, not sparse), where
 NS = 6 for SR = 48 kHz,
 NS = 12 for SR = 96 kHz,
 NS = 24 for SR = 192 kHz.

Table 1 below summarizes the possible parameter combinations for the Base Format Type.

Data encapsulation	PCM		
Format	AAF		
Bit depth	32		
Number of channels	1, 2, 4, 6, 8		
Sample rate	48 kHz	96 kHz	192 kHz
Samples per PDU	6	12	24

Table 1: Base Formats

6. REQUIREMENTS

6.1. TALKERS REQUIREMENTS

A PAAD Talker shall implement a PAAD-AE Base Talker.

A PAAD-AE Base Talker shall have at least one CONFIGURATION that contains at least one STREAM_OUTPUT which advertises support for a Base format in its list of supported formats.

A PAAD-AE Base Talker shall transport its AVDECC-exposed Base Format streams according to Stream Reservation Class A.

A PAAD-AE Base Talker may advertise any Base Format that is reasonable for its functionality.

6.2. LISTENERS REQUIREMENTS

A PAAD Listener shall implement a PAAD-AE Base Listener.

A PAAD-AE Base Listener shall have at least one CONFIGURATION that contains at least one STREAM_INPUT which advertises support for a Base format in its list of supported formats.

If the PAAD-AE Base Listener advertises support for a 48kHz (resp. 96kHz, 192kHz) Base format in a STREAM_INPUT, then it shall also advertise support for all the other 48kHz (resp. 96kHz, 192kHz) Base formats in this STREAM_INPUT.

Note: This ensures that a STREAM_INPUT that supports the Base format supports all defined channel counts.

If the PAAD-AE Base Listener advertises support for a 48kHz (resp. 96kHz, 192kHz) Base format in a STREAM_INPUT of a given CONFIGURATION, then it shall advertise support for a 48kHz (resp. 96kHz, 192kHz) Base format in all the STREAM_INPUTs which advertise support for a Base format, in this CONFIGURATION.

Note: This ensures that the same sampling rates are supported by all STREAM_INPUTs that support the Base format in a given configuration.

7. ANNEX

Table 4 below lists all formats and the corresponding AVDECC format strings that are specified in this document.

If a PAAD-AE supports any count from 1 up to N channels per frame, then it should use the ut bit, as specified in AVTP, annex I.2.4, to describe all the related formats using a single AVDECC format string.

Format Type	Version	Subtype	Nominal sample rate	Format	Bit depth	Channels per frame	Samples per frame	AVDECC format string
Base	0	AVTP_AUDIO_SUBTYPE (0x02)	48 kHz (5)	32-bit integer (2)	32	1	6	0x0205022000406000
						2		0x0205022000806000
						4		0x0205022001006000
						6		0x0205022001806000
						8		0x0205022002006000
			96 kHz (7)			1	12	0x020702200040C000
						2		0x020702200080C000
						4		0x020702200100C000
						6		0x020702200180C000
						8		0x020702200200C000
			192 kHz (9)			1	24	0x0209022000418000
						2		0x0209022000818000
						4		0x0209022001018000
						6		0x0209022001818000
						8		0x0209022002018000

Table 4: Summary of Base audio stream formats