UNIVERSAL SERIAL BUS
DEVICE CLASS DEFINITION
FOR
TERMINAL TYPES

Release 3.0

September 22, 2016

SCOPE OF THIS RELEASE

This document is the Release 3.0 of this device class definition.

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REVISION HISTORY

Revision	Date	Filename	Description
1.0	Mar. 18, 98	Termt10.pdf	Release 1.0
2.0	May. 31, 06	Termt20 final.pdf	Release 2.0
3.0	Sep. 22, 16	Termt30.pdf	Release 3.0

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1 INTRODUCTION

The intention of this document is to describe in detail all the Terminal Types that are supported by the Audio Device Class. This document is considered an integral part of *the Audio Device Class Specification*, although subsequent revisions of this document are independent of the revision evolution of the main *Audio Device Class Specification*. This is to easily accommodate the addition of new Terminal Types without impeding the core *Audio Device Class Specification*.

1.1 SCOPE

The Audio Device Class Definition applies to all devices or functions embedded in composite devices. All audio signals inside an audio function start at an Input Terminal, pass through some Units, and leave the function through an Output Terminal. Units can manipulate the signal in various ways. Terminals represent the connections of the function to the outside world.

As part of the Terminal descriptor, the **wTerminalType** field specifies the vendor's suggested use of the Terminal. For example, a pair of speakers is a more suitable target for music output than a telephone line. This feature allows a vendor to ensure that applications use the device in a consistent and meaningful way.

1.2 RELATED DOCUMENTS

- *Universal Serial Bus Specification*, 1.0 final draft revision (also referred to as the *USB Specification*). In particular, see Chapter 9, "USB Device Framework".
- Universal Serial Bus Device Class Definition for Audio Data Formats (referred to in this document as USB Audio Data Formats).
- ANSI S1.11-1986 standard.
- AES10-2003 AES Recommended Practice for Digital Audio Engineering – Serial Multichannel Audio Digital Interface (MADI)
- MPEG-1 standard ISO/IEC 111172-3 1993.
- MPEG-2 standard ISO/IEC 13818-3 Feb. 20, 1997.
- Digital Audio Compression Standard (AC-3), ATSC A/52 Dec. 20, 1995. (available from http://www.atsc.org)
- ANSI/IEEE-754 floating-point standard.
- ISO/IEC 958 International Standard: Digital Audio Interface and Annexes.
- ISO/IEC 1937 standard.
- ITU G.711 standard.

1.3 TERMS AND ABBREVIATIONS

None.

2   TERMINAL TYPES

The following is a list of possible Terminal Types. This list is non-exhaustive and will only be expanded in the future.

2.1   USB TERMINAL TYPES

These Terminal Types describe Terminals that handle signals carried over the USB, usually through isochronous pipes. These Terminal Types are valid for both Input and Output Terminals.

Table 2-1: USB Terminal Types

Terminal Type	Code	I/O	Description
USB Undefined	0x0100	I/O	USB Terminal, undefined Type.
USB streaming	0x0101	I/O	A Terminal dealing with a signal carried over an endpoint in an AudioStreaming interface. The AudioStreaming interface descriptor points to the associated Terminal through the bTerminalLink field.
USB vendor specific	0x01FF	I/O	A Terminal dealing with a signal carried over a vendor-specific interface. The vendor-specific interface descriptor must contain a field that references the Terminal.

2.2   INPUT TERMINAL TYPES

These Terminal Types describe Terminals that are designed to record sounds. They either are physically part of the audio function or can be assumed to be connected to it in normal operation. These Terminal Types are valid only for Input Terminals

Table 2-2: Input Terminal Types

Terminal Type	Code	I/O	Description
Input Undefined	0x0200	I	Input Terminal, undefined Type.
Microphone	0x0201	I	A generic microphone that does not fit under any of the other classifications.
Desktop microphone	0x0202	I	A microphone normally placed on the desktop or integrated into the monitor.
Personal microphone	0x0203	I	A head-mounted or clip-on microphone.
Omni-directional microphone	0x0204	I	A microphone designed to pick up voice from more than one speaker at relatively long ranges.
Microphone array	0x0205	I	An array of microphones designed for directional processing using host-based signal processing algorithms.
Processing microphone array	0x0206	I	An array of microphones with an embedded signal processor.

2.3   OUTPUT TERMINAL TYPES

These Terminal Types describe Terminals that produce audible signals that are intended to be heard by the user of the audio function. They either are physically part of the audio function or can be assumed to be connected to it in normal operation. These Terminal Types are only valid for Output Terminals. The distinction between headphones, desktop speakers, and room speakers may be used by applications to select different 3D signal processing algorithms.

Table 2-3: Output Terminal Types

Terminal Type	Code	I/O	Description
Output Undefined	0x0300	O	Output Terminal, undefined Type.
Speaker	0x0301	O	A generic speaker or set of speakers that does not fit under any of the other classifications.
Headphones	0x0302	O	A head-mounted audio output device.
Head Mounted Display Audio	0x0303	O	The audio part of a VR head mounted display. The Associated Interfaces descriptor can be used to reference the HID interface used to report the position and orientation of the HMD.
Desktop speaker	0x0304	O	Relatively small speaker or set of speakers normally placed on the desktop or integrated into the monitor. These speakers are close to the user and have limited stereo separation.
Room speaker	0x0305	O	Larger speaker or set of speakers that are heard well anywhere in the room.
Communication speaker	0x0306	O	Speaker or set of speakers designed for voice communication.
Low frequency effects speaker	0x0307	O	Speaker designed for low frequencies (subwoofer). Not capable of reproducing speech or music.

2.4   BI-DIRECTIONAL TERMINAL TYPES

These Terminal Types describe an Input and an Output Terminal for voice communication that are closely related. They should be used together for bi-directional voice communication. They may be used separately for input only or output only. These types require two Terminal descriptors. Both have the same type. The two Terminals are linked together through the **bAssocTerminal** fields in their respective Terminal descriptors. The Associated Interfaces descriptor can be used to reference a HID interface for conferencing functions.

Table 2-4: Bi-directional Terminal Types

Terminal Type	Code	I/O	Description
Bi-directional Undefined	0x0400	I/O	Bi-directional Terminal, undefined Type.
Handset	0x0401	I/O	Hand-held bi-directional audio device.
Headset	0x0402	I/O	Head-mounted bi-directional audio device.

Speakerphone, no echo reduction	0x0403	I/O	A hands-free audio device designed for host-based echo cancellation.
Echo-suppressing speakerphone	0x0404	I/O	A hands-free audio device with echo suppression capable of half-duplex operation.
Echo-canceling speakerphone	0x0405	I/O	A hands-free audio device with echo cancellation capable of full-duplex operation.

2.5 TELEPHONY TERMINAL TYPES

These Terminal Types describe Terminals that connect to the PSTN or PBX. Initiating calls and monitoring call progress will be done through an associated interface which may be Communication, HID or Vendor-Specific class. These Terminals are bi-directional and follow the rules for bi-directional Terminals.

Table 2-5: Telephony Terminal Types

Terminal Type	Code	I/O	Description
Telephony Undefined	0x0500	I/O	Telephony Terminal, undefined Type.
Phone line	0x0501	I/O	May be an analog telephone line jack, an ISDN line, a proprietary PBX interface, or a wireless link.
Telephone	0x0502	I/O	Device can be used as a telephone. When not in use as a telephone, handset is used as a bi-directional audio device.
Down Line Phone	0x0503	I/O	A standard telephone set connected to the device. When not in use as a telephone, it can be used as a bi-directional audio device.

2.6 EXTERNAL TERMINAL TYPES

These Terminal Types describe external resources and connections that do not fit under the categories of Input or Output Terminals because they do not necessarily translate acoustic signals to or from the user of the computer. Most of them may be either Input or Output Terminals.

Table 2-6: External Terminal Types

Terminal Type	Code	I/O	Description
External Undefined	0x0600	I/O	External Terminal, undefined Type.
Analog connector	0x0601	I/O	A generic analog connector.
Digital audio interface	0x0602	I/O	A generic digital audio interface.
Line connector	0x0603	I/O	An analog connector at standard line levels. Usually uses 3.5mm.
Legacy audio connector	0x0604	I/O	An input connector assumed to be connected to the lineout of the legacy audio system of the host computer. Used for backward compatibility.
S/PDIF interface	0x0605	I/O	An S/PDIF digital audio interface. The Associated Interface descriptor can be used

			to reference an interface used for controlling special functions of this interface.
1394 DA stream	0x0606	I/O	An interface to audio streams on a 1394 bus.
1394 DV stream soundtrack	0x0607	I/O	An interface to soundtrack of A/V stream on a 1394 bus.
ADAT Lightpipe	0x0608	I/O	An optical connection carrying the Alesis Digital Audio Tape stream. Contact Alesis for technical information.
TDIF	0x0609	I/O	Tascam Digital Interface. Contact Tascam for technical information.
MADI	0x060A	I/O	Multi-channel Audio Digital Interface as defined by AES.

2.7 EMBEDDED FUNCTION TERMINAL TYPES

These Terminal Types represent connections to internal audio sources or sinks in a device. All have associated interfaces for control. These interfaces may be HID or other classes (vendor-specific, mass storage for CD-ROM, etc.). Devices capable of both playback and recording should follow the rules for bi-directional Terminals.

Table 2-7: Embedded Terminal Types

Terminal Type	Code	I/O	Description
Embedded Undefined	0x0700	I/O	Embedded Terminal, undefined Type.
Level Calibration Noise Source	0x0701	O	Internal Noise source for level calibration (MPEG decoding, Dolby Prologic™, AC-3 etc.)
Equalization Noise	0x0702	O	Internal Noise source for measurements.
CD player	0x0703	I	Audio compact disc player or CD-ROM capable of audio playback.
DAT	0x0704	I/O	Digital Audio Tape.
DCC	0x0705	I/O	Digital Compact Cassette.
Compressed Audio Player	0x0706	I/O	Compressed Audio player.
Analog Tape	0x0707	I/O	Analog Audio Tape.
Phonograph	0x0708	I	Analog vinyl record player.
VCR Audio	0x0709	I	Audio track of VCR.
Video Disc Audio	0x070A	I	Audio track of VideoDisc player.
DVD Audio	0x070B	I	Audio track of DVD player.
TV Tuner Audio	0x070C	I	Audio track of TV tuner.
Satellite Receiver Audio	0x070D	I	Audio track of satellite receiver.
Cable Tuner Audio	0x070E	I	Audio track of cable tuner.
DSS Audio	0x070F	I	Audio track of DSS receiver.
Radio Receiver	0x0710	I	AM/FM radio receiver.
Radio Transmitter	0x0711	O	AM/FM radio transmitter.
Multi-track Recorder	0x0712	I/O	A multi-track recording system.

Synthesizer	0x0713	I/O	Synthesizer.
Piano	0x0714	I/O	Piano
Guitar	0x0715	I/O	Guitar
Drums/Rhythm	0x0716	I/O	Percussion Instrument
Other Musical Instrument	0x0717	I/O	Undefined Musical Instrument

3   ADDING NEW TERMINAL TYPES

Adding new Terminal Types to this specification is achieved by proposing a fully documented Terminal Type to the Audio Device Class Working Group. Upon acceptance, the group will register the new Terminal Type (attribute a unique Terminal Type Code) and update this document accordingly. This process will also guarantee that new releases of generic USB audio drivers will support the newly registered Terminal Types.

It is always possible to use vendor-specific definitions if the above procedure is considered unsatisfactory.