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GENERIC AUDIO/VIDEO DISTRIBUTION PROFILE

Abstract

This profile defines the requirements for *Bluetooth*® devices necessary to set up streaming channels used for support of audio/video distribution. The requirements are expressed in terms of services provided to applications, and by defining the features and procedures that are required for interoperability between Bluetooth devices in the Audio/Video Distribution usage model.

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Document Terminology

The Bluetooth SIG has adopted Section 13.1 of the IEEE Standards Style Manual, which dictates use of the words “shall’’, “should’’, “may’’, and “can’’ in the development of documentation, as follows:

- The word *shall* is used to indicate mandatory requirements strictly to be followed in order to conform to the standard and from which no deviation is permitted (*shall* equals *is required to*).
- The use of the word *must* is deprecated and shall not be used when stating mandatory requirements; *must* is used only to describe unavoidable situations.
- The use of the word *will* is deprecated and shall not be used when stating mandatory requirements; *will* is only used in statements of fact.
- The word *should* is used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required; or that (in the negative form) a certain course of action is deprecated but not prohibited (*should* equals *is recommended that*).
- The word *may* is used to indicate a course of action permissible within the limits of the standard (*may* equals *is permitted*).
- The word *can* is used for statements of possibility and capability, whether material, physical, or causal (*can* equals *is able to*).

Contents

1 Introduction

1.1 Scope

The Generic Audio/Video Distribution Profile (GAVDP) defines a generic part of the protocols and procedures that realize distribution of audio content and/or video content using ACL channels. The profile specifies signaling transaction procedures between two devices to set up, terminate, and reconfigure streaming channels. Streaming parameters and encode/decode features are included in Advanced Audio Distribution Profile [1] and Video Distribution Profile that depend on this profile.

1.2 Profile Dependency

In Figure 1.1 the structure and the dependencies of the profiles are depicted. A profile is dependent upon another profile if it re-uses parts of that profile, by implicitly or explicitly referencing it. Dependency is illustrated in the figure. A profile has dependencies on the profile(s) in which it is contained – directly and indirectly. As indicated in the figure, the Generic Audio/Video Distribution profile is dependent only upon the Generic Access Profile [2]. The terminology, user interface and security aspects, modes and procedures as defined in the Generic Access Profile are applicable to this profile, unless explicitly stated otherwise.

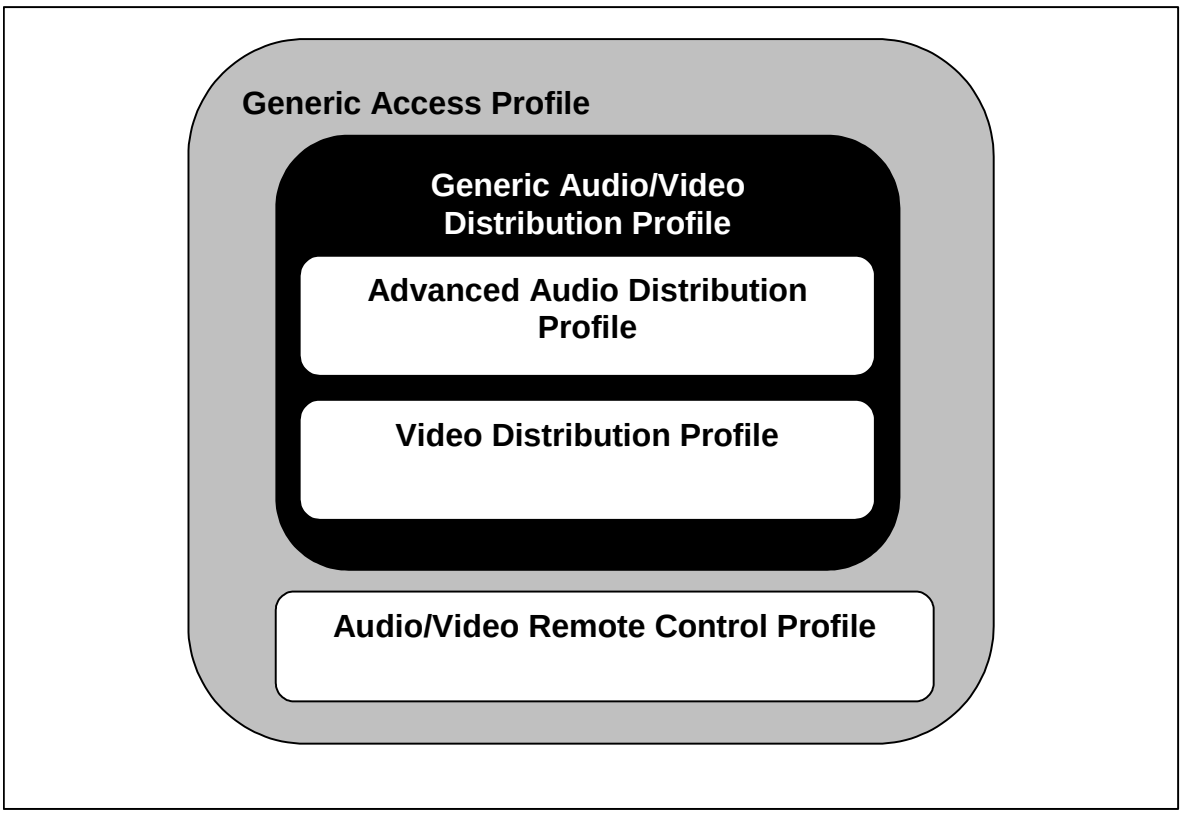

Figure 1.1: Profile Dependency

1.3 Symbols and Conventions

1.3.1 Requirement Status Symbols

In this document the following symbols are used:

‘M’ for mandatory to support (used for capabilities that shall be used in the profile).

‘O’ for optional to support (used for capabilities that may be used in the profile).

‘C’ for conditional support (used for capabilities that shall be used in case a certain other capability is supported).

‘X’ for excluded (used for capabilities that may be supported by the unit, but that shall never be used in the profile).

‘N/A’ for not applicable (in the given context it is impossible to use this capability).

Some excluded capabilities are capabilities that, according to the relevant Bluetooth specification, are mandatory. These are features that may degrade operation of devices following the GAVDP. Therefore, these features shall never be activated while a unit is operating as a unit within this profile.

1.3.2 Signaling Diagram Conventions

In this profile, protocol signals are exchanged by initiating procedures in communicating devices and by exchanging messages. Signaling diagrams use the conventions of Figure 1.2 below. A and B represent devices playing a specific role as defined in Section 1.6.

Specific arrow styles are used in the diagrams to indicate the relevant procedures initiated by the participant devices and the exchanged messages. The STATE of two devices is also expressed in the diagrams.

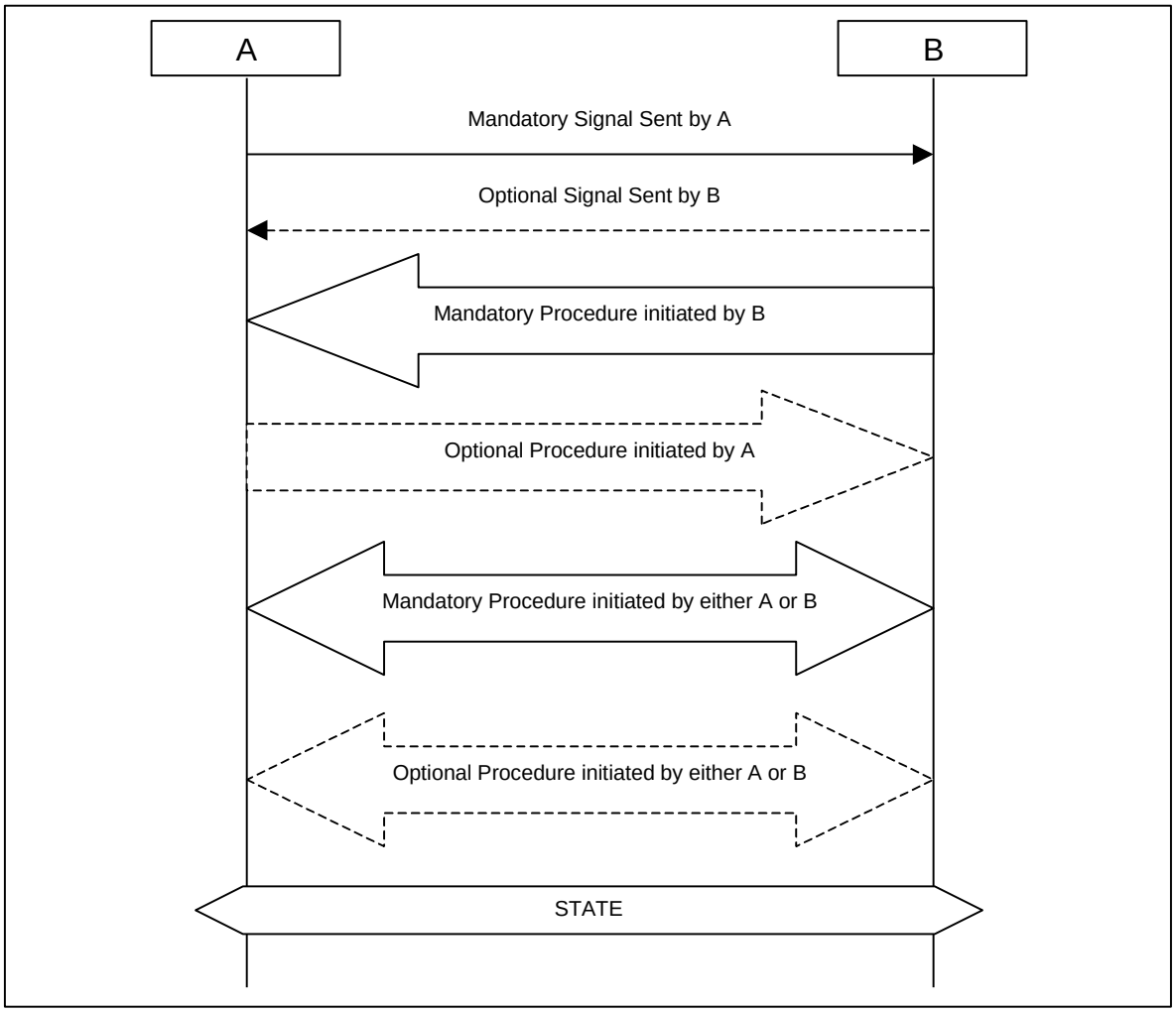

Figure 1.2: Signaling Conventions

1.3.3 Notation for Timers

Bluetooth timer is introduced in this profile. To distinguish them from timers used in other parts of the specification, these timers are named according to the following convention:

- "$T_{GAVDP}nnn$" for timers

1.4 Bluetooth GAVDP Profile Change History

1.4.1 Changes from 1.2 to 1.3

1.4.1.1 General Changes

- Incorporation of enhancements from Core Specification 2.1 + EDR
- Incorporation of adopted changes to correct errata. Relevant erratum is 928.

1.4.1.2 New Features

- Interoperability with the Delay Reporting feature from Audio/Video Distribution Transport Protocol 1.3 to enhance A/V synchronization
- Interoperability with the Get All Capabilities procedure from Audio/Video Distribution Transport Protocol 1.3
- Interoperability with Generic Access Profile security and idle mode procedures defined in Core Specification 2.1 + EDR
- Interoperability with Generic Access Profile security and idle mode procedures defined in Core Specification 2.1 + EDR Profile Overview

1.5 Profile Stack

Figure 1.3 shows the protocols used in this profile.

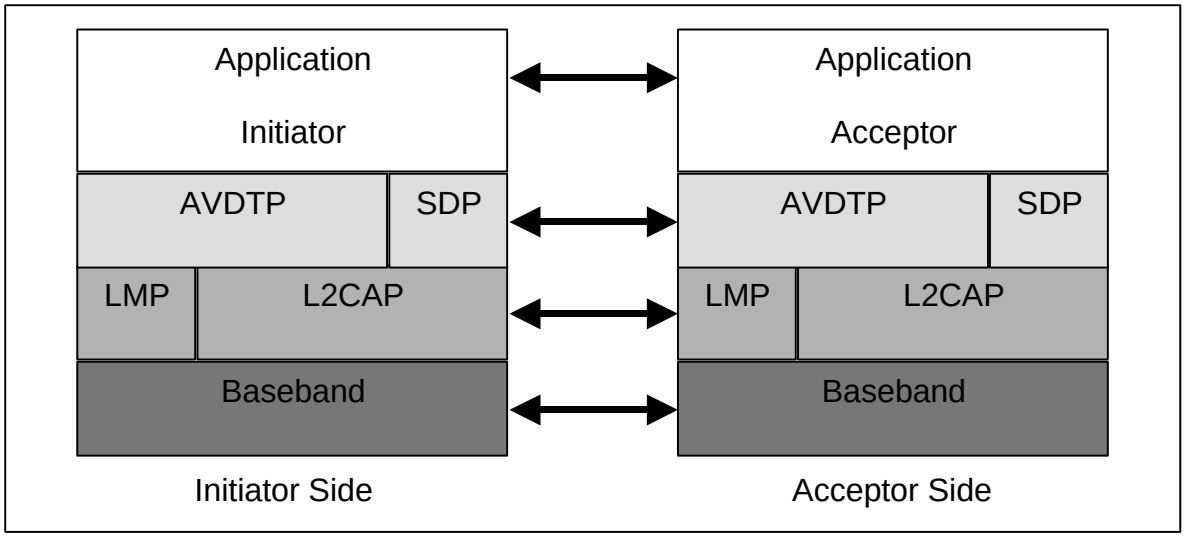

Figure 1.3: Protocol Model

The Baseband[3] LMP [4], L2CAP [5] and SDP [6] are Bluetooth protocols defined in the Bluetooth Core specifications. AVDTP [7] consists of a signaling entity for negotiation of streaming parameters and a transport entity that handles the streaming. For reference, see Chapter 2 and Chapter 5 of AVDTP [7].

1.6 Configurations and Roles

The following roles are defined for devices that implement this profile:

Initiator (INT) – This is the device that initiates a signaling procedure.

Acceptor (ACP) – This is the device that shall respond to an incoming request from the **INT**.

Note that the roles are not fixed to the devices. The roles are determined when the user initiates a signaling procedure defined in Section 3.1, and they are released when the

procedure ends. The roles can be switched between two devices when a new procedure is initiated.

An example of configurations illustrating the roles for this profile is depicted in Figure 1.4.

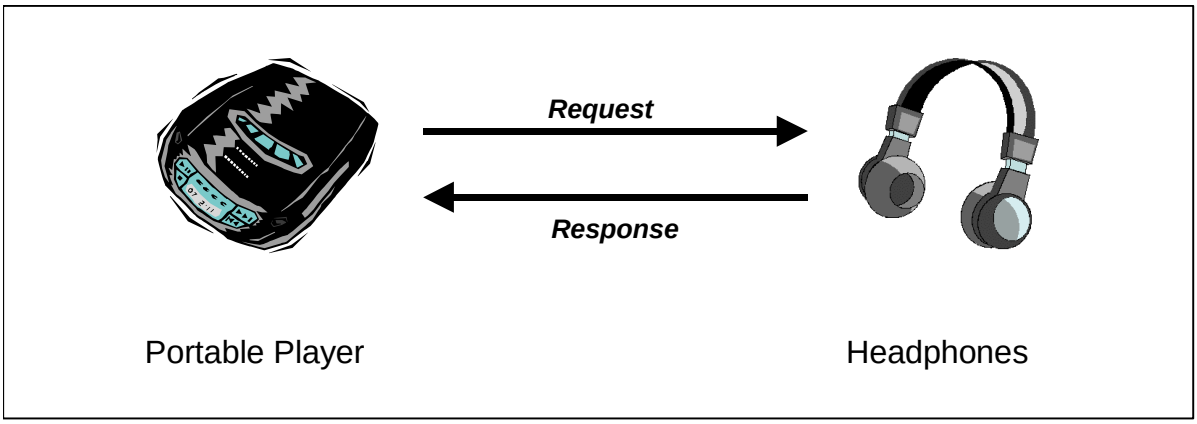

Figure 1.4: Examples of Configuration

In Figure 1.4, a portable player is the **INT** and headphones are the **ACP**. The **INT** sends signaling messages, for example, to request the establishment of a connection, or control the stream. In the first example the **ACP** shall respond to an incoming stream establishment request from the **INT**. In the second case the **ACP** shall provide the information such as services and transport capabilities it supports.

Note again that the roles can be switched: the portable player can become the **ACP** while the headphones behave as the **INT**. It depends on profile, application and implementation.

In addition to the INT/ACP roles the following roles are defined for devices that implement this profile:

Source (SRC) – A device is the **SRC** when it acts as a source of a digital stream that is delivered to the **SNK** of the piconet.

Sink (SNK) – A device is the **SNK** when it acts as a sink of a digital stream delivered from the **SRC** on the same piconet.

The INT/ACP and SRC/SNK roles are orthogonal and independent of each other. Both SNK and SRC can be either ACP or INT.

1.7 User Requirements and Scenarios

The following scenarios are covered by this profile:

- Set up two devices for A/V data streaming that flows from one end to another, and then connect these devices with Bluetooth transaction.
- Control the established streaming.

1.8 Profile Fundamentals

The profile works with Bluetooth v2.0 and later versions. Specifically, it can benefit from the usage of features introduced in later versions. The features seen most relevant for this profile are:

1 L2CAP Enhanced Retransmission and Streaming Modes and Non-automatically Flushable Packet Boundary Flag: Either of these mechanisms will provide reliable signaling transmission while still allowing non-critical time sensitive media packets to be dropped. If neither of these mechanisms is used, critical signaling packets can be dropped as a result of a flush timeout on a baseband level. AVDTP requires that signaling packets be reliably delivered and thus loss of signaling packets will usually be fatal to AVDTP and may result in the connection being dropped. Dropping “expired” non-critical media packets on the other hand is non-fatal and in fact often desirable. Therefore, if the device supports a means for simultaneous unreliable and reliable L2CAP channels on the same ACL link, it should be used.

2 Adaptive frequency hopping: Adaptive frequency hopping will improve the robustness of the streaming channel and hence increase the perceived quality of the media (Audio and/or Video).

3 Enhanced Data Rate: The radio link will provide a higher data rate and thus will allow more efficient usage of the ACL, more capacity for retransmissions (to make the audio streaming more reliable) and provide more capacity for other applications in multi-profile/device scenarios.

1.9 Conformance

When conformance to this profile is claimed, all capabilities indicated mandatory for this profile shall be supported in the specified manner (process mandatory). This also applies for optional and conditional capabilities for which support is indicated. All mandatory, optional, and conditional capabilities, for which support is indicated, are subject to verification as part of the Bluetooth certification program.

2 Application Layer

This section describes the feature requirements on units complying with the GAVDP. There is no fixed **INT**/**ACP** role for the devices.

Table 2.1shows the feature requirements for this profile.

Item No.	Feature	Support in INT*	Support in ACP**
1	Connection	M	M
2	Transfer Control	O	O
3	Signaling Control	M	M
4	Security Control	O	O
5	Delay Reporting	O	O
* The mandatory and optional requirements only apply on the initiator part of the procedure. ** The mandatory and optional requirements only apply on the acceptor part of the procedure.			

Table 2.1: Application Layer Features

Table 2.2 maps each feature to the procedures used for that feature, and shows whether the procedure is optional or mandatory for that feature. The procedures are described in the referenced section.

Item No.	Feature	Procedure	Ref.	Support in INT*	Support in ACP**
1	Connection	Connection Establishment	3.1.1	M	M
		Start Streaming	3.1.2	M	M
		Connection Release	3.1.3	M	M
2	Transfer Control	Suspend	3.1.4	O	O
		Change Parameters	3.1.5	O	O
3	Signaling Control	Abort	3.1.6	M	M
4	Security Control	Security Control	3.1.7	O	O
5	Delay Reporting	Delay Reporting	3.1.8	O	O
* The mandatory and optional requirements only apply on the initiator part of the procedure. ** The mandatory and optional requirements only apply on the acceptor part of the procedure.					

Table 2.2: Application Layer Feature to Procedure Mapping

3 AVDTP Interoperability Requirements

3.1 Signaling Procedures

The interoperability requirements for the signaling entity are contained in this section.

In use of AVDTP the following three states are exposed to the users of GAVDP:

- <IDLE>: The initial state where no streaming connection has been established, while L2CAP channel for signaling is already open.
- <OPEN>: The streaming connection has been established between two devices.
- <STREAMING>: Both devices are ready for streaming.

Figure 3.1 shows the possible transitions. *Security Control* procedure in Section 3.1.7 can be executed in <OPEN> and <STREAMING> and does not result in a state change. For more details, see Section 6.3 and Chapter 8 of AVDTP [7].

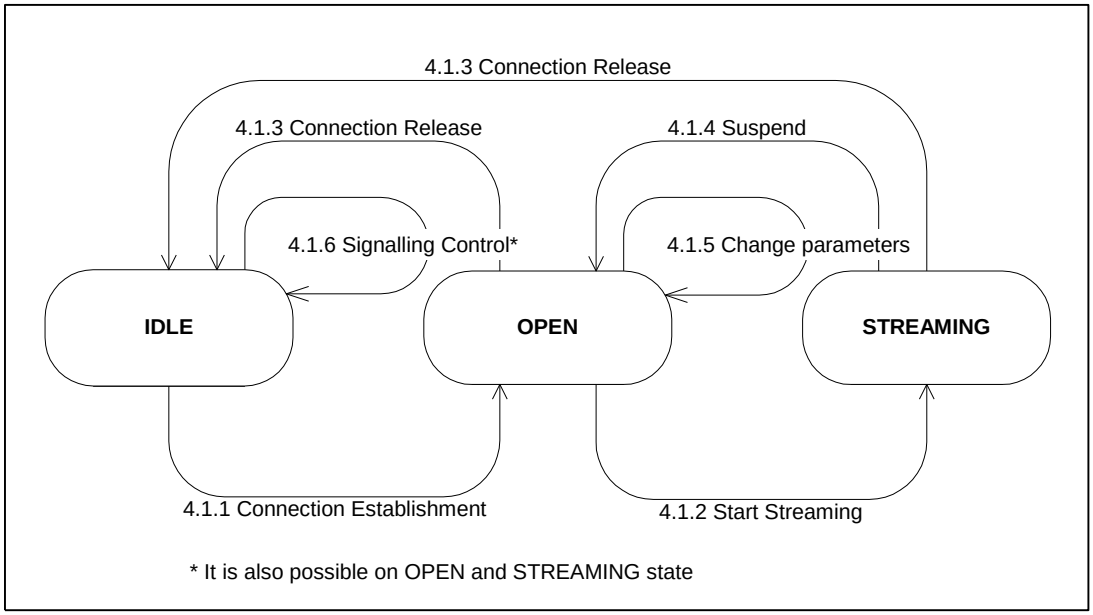

Figure 3.1: Signaling Procedures

3.1.1 Connection Establishment

This procedure shall be used when a device wishes to establish a streaming connection with the other device. Prior to initiating this procedure, an L2CAP channel for signaling shall be established as described in Section 6.1 of AVDTP [7]. The initial state of the both devices is <IDLE>.

Then, the **INT** shall initiate *Stream Endpoint (SEP) Discovery* procedure of AVDTP if the **INT** has not collected SEP information before, or wishes to refresh it.

Depending on the AVDTP version of the ACP two different procedures shall be used to query the capabilities of a SEP. If the ACP AVDTP version is 1.3 or newer, only **Get All**

Capabilities shall be used, otherwise only the original **Get Capabilities** shall be used to query capabilities.

Then, *Get All Capabilities* or *Get Capabilities* procedure of AVDTP should be initiated to collect service capabilities of the **ACP** using the SEP information. This procedure does not have to be executed when the **INT** already knows the services provided by the **ACP**.

Based on collected SEP information and service capabilities, the **INT** shall select specific services and configure the **ACP** by using the *Stream Configuration* procedure defined in AVDTP.

Then the Delay Reporting procedure shall run if Delay Reporting has been configured in order to provide a delay value for audio/video synchronization. For the Delay Reporting procedure the SNK is always the INT as shown in Figure 3.2 and Figure 3.3.

Then, L2CAP channels are established as defined in the *Stream Establishment* procedure in AVDTP. Finally, the states of both devices are set to <OPEN>. The **INT**/**ACP** roles are released after the procedure is completed.

Note: If the L2CAP channel establishment has failed after the Open Stream Command of AVDTP, it is recommended to perform the Abort Command of AVDTP to get both **ACP** and **INT** synchronized.

To start a stream, the *Start Streaming* procedure in Section 3.1.2 shall be initiated to confirm if both devices are ready for streaming and change the state from <OPEN> to <STREAMING> as defined in Section 6.5 of AVDTP [7].

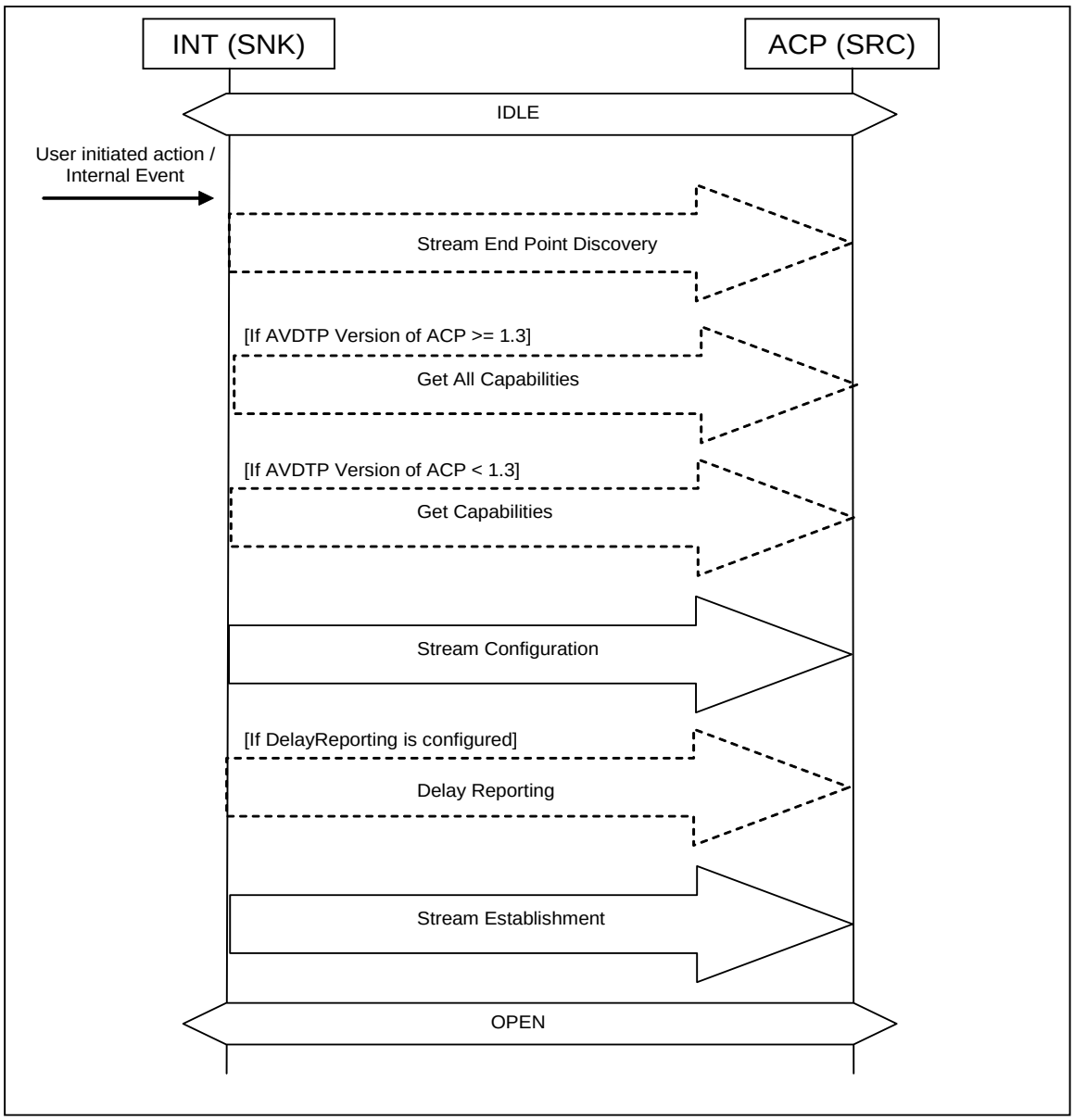

Figure 3.2: Connection Establishment: SNK is INT

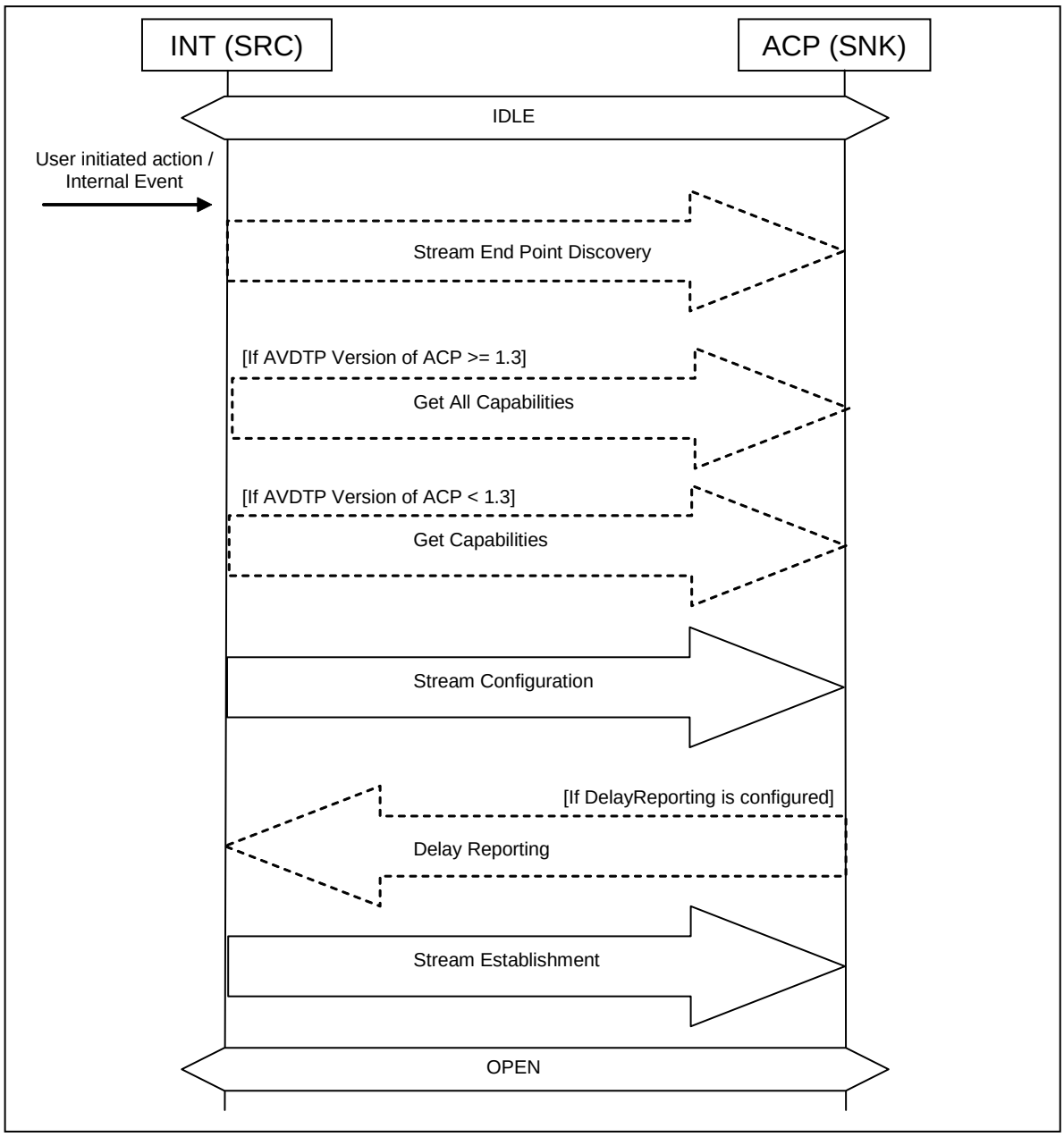

Figure 3.3: Connection Establishment: SRC is INT

3.1.2 Start Streaming

When the device wishes to start or resume the A/V streaming, this procedure shall be initiated to change the state from <OPEN> to <STREAMING> as defined in Section 6.5 of AVDTP [7].

The **INT** initiates *Start Streaming* procedure of AVDTP by a user initiated action or an internal event. The streaming shall be started/resumed after this procedure.

[E928]If the ACP is a SRC device and the media does not match the format supported by the SEP or if the parameter that the SEP is configured with does not match the

properties of the media the SRC/ACP may take the role as INT and perform any of the following two sequences of procedures 1) "Connection Release", Connection Establishment", and "Start Streaming"; or 2) "Suspend", "Change Parameters", and "Start Streaming".

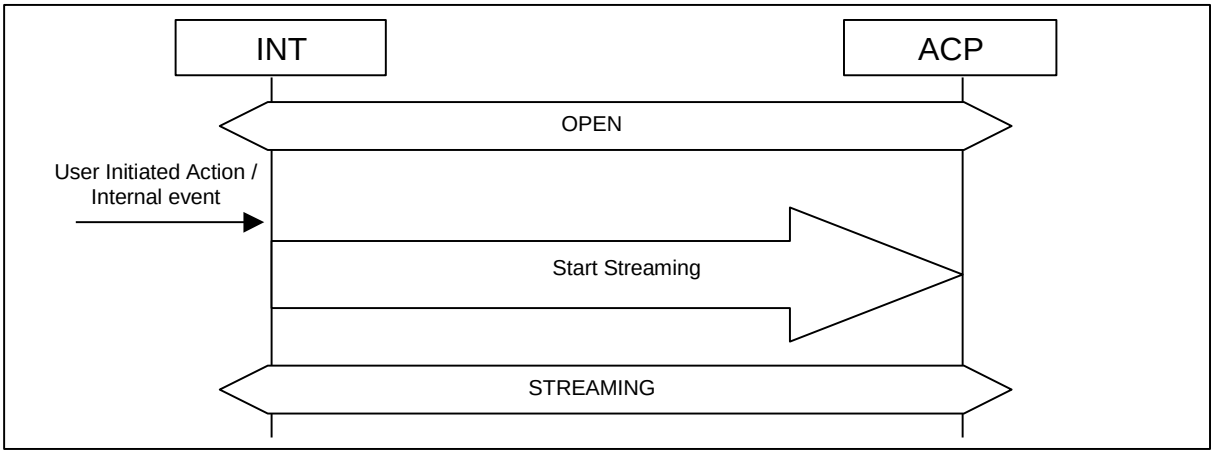

Figure 3.4: Start Streaming

3.1.3 Connection Release

The **INT** initiates the *Stream Release* procedure of AVDTP to release L2CAP channels for streaming. This procedure may be initiated both from <OPEN> and <STREAMING>, and set the state at <IDLE> for both devices.

The L2CAP channel for signaling may be released after this procedure, if necessary.

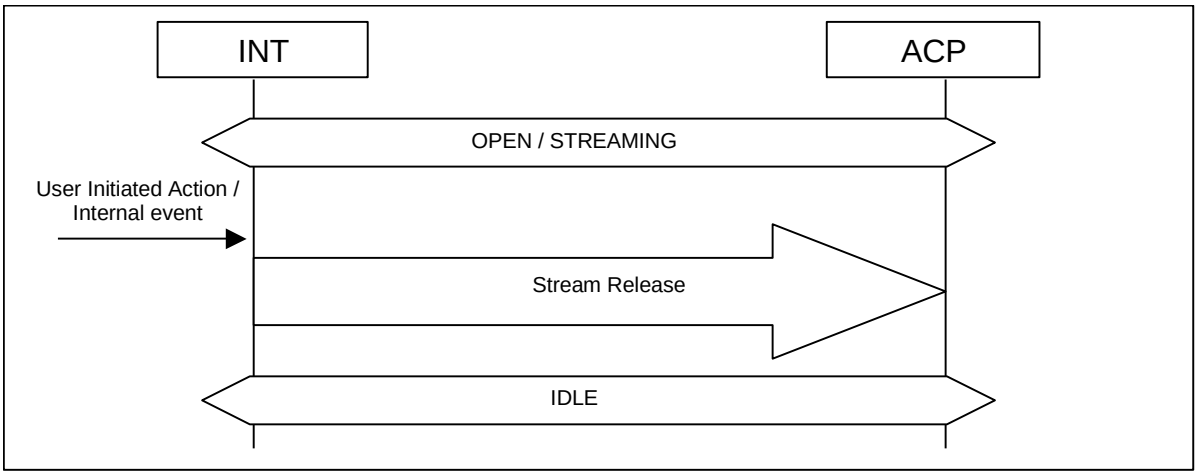

Figure 3.5: Connection Release

3.1.4 Suspend

When the device wishes to suspend the A/V streaming, this procedure shall be initiated to change the state from <STREAMING> to <OPEN>.

The **INT** initiates *Stream Suspend* procedure of AVDTP by a user initiated action or an internal event. The streaming shall be suspended after this procedure.

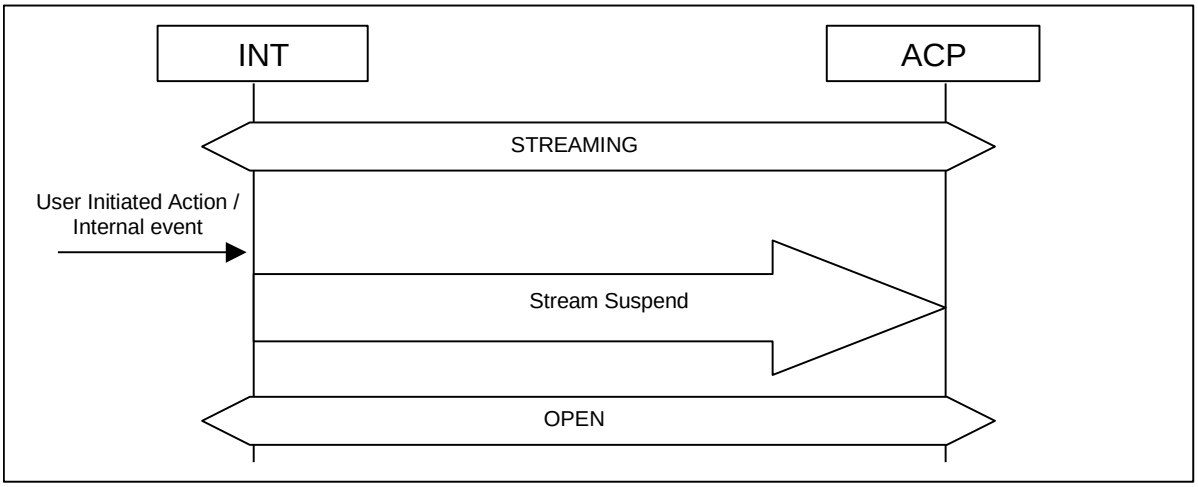

Figure 3.6: Suspend

3.1.5 Change Parameters

In order to change the application service parameters, both devices shall be in <OPEN> state. If the state is <STREAMING> the *Suspend* procedure in section 3.1.4 shall be executed beforehand to suspend the stream and change the state to <OPEN> for both devices.

The procedure is initiated by a user action or an internal event. If the **INT** has not obtained service capability information of the **ACP** by then, the *Get Capabilities* procedure of AVDTP is executed first. Then, the **INT** selects and specifies new parameters according to the information and requests the **ACP** to reconfigure these parameters with the *Stream Reconfigure* procedure of AVDTP.

After closing this procedure, the state of the devices remains <OPEN>. It is necessary to initiate *Start Streaming* procedure defined in Section 3.1.2 to resume the stream.

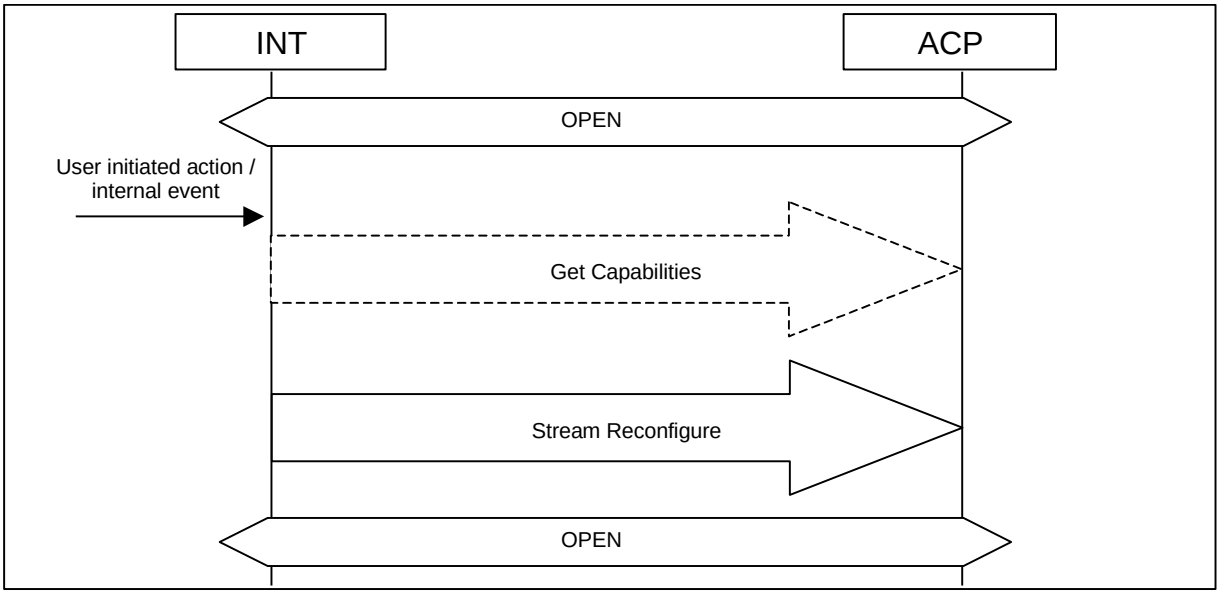

Figure 3.7: Change Parameters

3.1.6 Signaling control

This procedure may be used to recover from a loss of a signaling message, which could result in inconsistency of the **INT** and the **ACP**. For more details, see Section 9.11 of AVDTP [7].

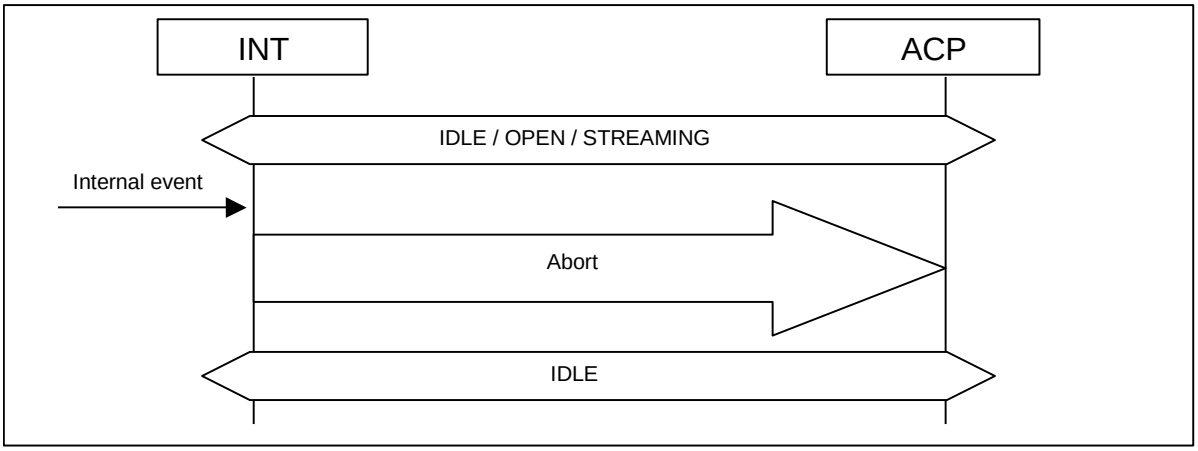

Figure 3.8: Signaling control

3.1.7 Security Control

This procedure shall be used to exchange security control messages between the **INT** and the **ACP**.

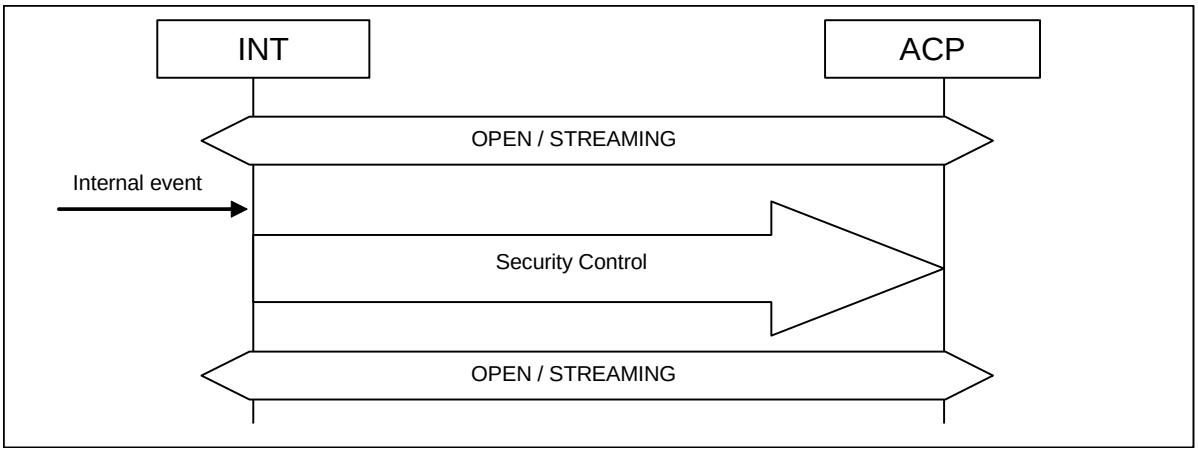

Figure 3.9: Security Control

3.1.8 Delay Reporting

3.1.8.1 Use Case

The A/V Delay Reporting feature solves a problematic use case in A/V streaming. This issue involves the user viewing a video while listening to the associated music with Bluetooth headphones. The user experiences that the audio and video are not synchronized due to delays caused by decoding, buffering or transmission. The delay

reporting mechanism improves the synchronization between the local video playback and audio streamed via the Bluetooth link.

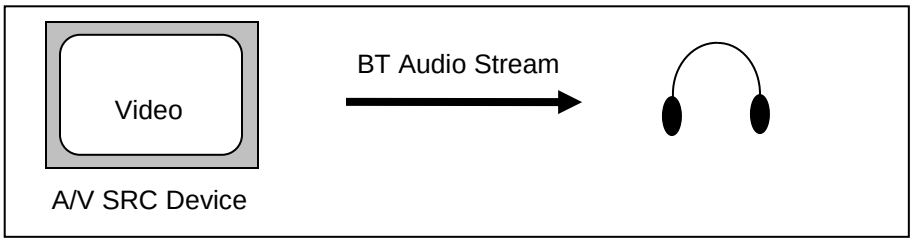

Figure 3.10: Audio Streaming

The second use case is given by a different scenario where both audio and video are streamed, each one to a different device. This happens for example in an in-car scenario where video is streamed to a rear seat display while audio is streamed to a headset.

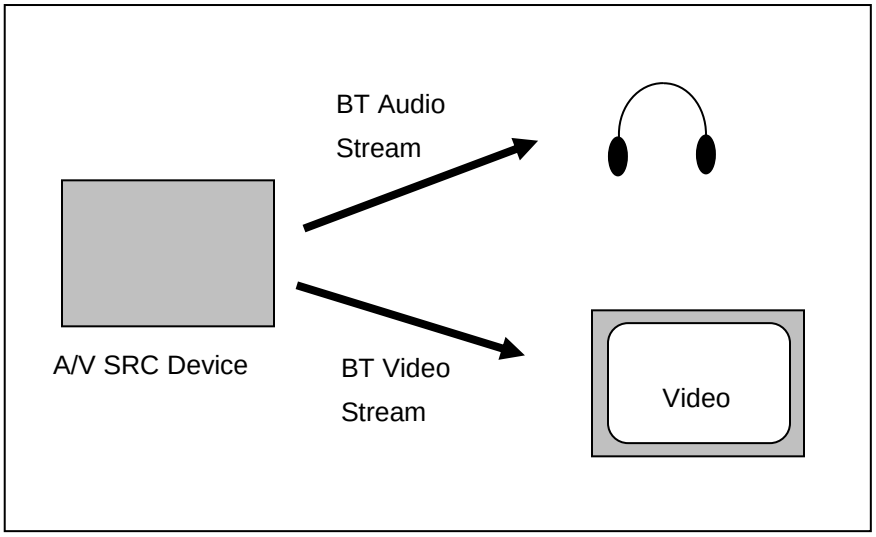

Figure 3.11: Audio and Video Streaming

The A/V synchronization method is based on the reporting of the buffering, decoding and rendering delay from the SNK devices. The SRC device is then responsible for keeping audio and video synchronized.

Once a SRC device knows the expected delays for the rendering of audio and video, the SRC is able to compensate the delay difference. This can be done by starting the stream with the higher delay value first. The second stream is started with a delay that corresponds to the delay difference of both devices. Changing delay values can be addressed for example by shifting video timestamp values of the sent video frames by the delay difference.

3.1.8.2 Delay Definition

The total delay from inserting a streaming frame at the SRC until the frame is presented by the SNK is comprised of a SRC delay, a transmit delay and a SNK delay as illustrated in Figure 3.12. Only the SNK delay is reported by a particular stream endpoint

(SEP) at the SNK. This enables the SRC to address its own individual delay caused by its own Bluetooth stack and buffers. The start and end of the SNK delay are defined in Table 3.1.

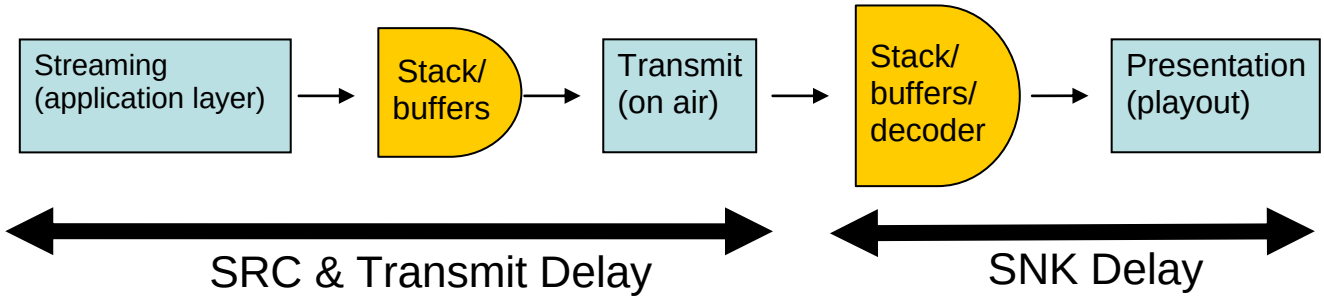

Figure 3.12: SRC and SNK delay

Definition SNK delay	
SNK_delay_start	Media Packet is received by the baseband
SNK_delay_end	Media Packet is presented to the user (e.g. on the loudspeaker or display)

Table 3.1: Sink delay

The SRC also needs to consider the transmission delay which involves internal delays (host, HCI and controller) as well as the configured Flush Timeout.

3.1.8.2.1 Allowed Delay Values

The maximum allowed and the recommended presentation delay between audio and video are defined in Table 3.2. Here positive values represent the case where audio is ahead of video.

The allowed presentation delay is based on an ITU-T Recommendation [11] in combination with an estimated production tolerance of +10 ms / -30 ms that is expected to be present in the media.

Delay Values	
Maximum allowed presentation delay between audio and video	+80/-150 ms
Recommended presentation delay between audio and video	+35/-95 ms
Maximum allowed deviation of reported SNK Delay	+/- 30 ms
Recommended deviation of reported SNK Delay	+/- 15 ms

Table 3.2: Delay Values

Table 3.2 also shows the allowed and recommended deviation of the reported SNK delay from the actual delay. The reported SNK delay shall be accurate within an accuracy range of +/- 30 ms which is about a quarter of the total Maximum allowed presentation delay. This results from the fact that there are four estimates for delay values, e.g. SNK and SRC delay for two devices.

3.1.8.3 Delay Reporting Service

The Delay Reporting Service provides the reporting of delay values from a SNK device to a SRC device. The reported delay value corresponds to the delay definition above.

When the Delay Reporting service is used, the SNK shall ensure that the real delay stays within the accuracy range of +/- 30 ms between two delay reports at all times. This means that a SNK shall compensate for clock drift in order to keep the delay accurate.

If audio and video is streamed via Bluetooth, the SRC device shall compensate for the difference of the reported delay values such that both streams are presented within the tolerances defined in the table above. If only one stream is sent via Bluetooth while the other one is rendered locally, the SRC needs to know the delay of the local rendering device to compensate for different delay values.

For dynamically changing delay values the SRC device shall keep the rendering of audio and video in sync. This could be done for example by duplicating or removing video frames or by modification of video timestamps.

3.1.9 AVDTP Signaling Procedures Overview

This section defines the required AVDTP signaling procedures in the Generic Audio/Video Distribution profile. Details of procedures and signaling messages are fully described in Chapter 6, 8, and 9 of AVDTP [7].

Item No.	Capability	Support in INT*	Support in ACP**	$T_{GAVDP}100$ applies
1	Stream End Point Discovery	M	M	No
2	Get Capabilities	M	M	No
3	Stream Configuration	M	M	Yes
4	Stream Establishment	M	M	Yes
5	Stream Start	M	M	Yes
6	Stream Release	M	M	Yes
7	Stream Suspend	O	O	Yes
8	Stream Reconfigure	O	O	Yes
9	Fragmentation	M	M	No
10	General Reject	N/A	M	No
11	Abort	M	M	Yes
12	Security Control	O	O	No
13	Delay Reporting	O	O	No
* The mandatory and optional requirements only apply on the initiator part of the procedure. ** The mandatory and optional requirements only apply on the acceptor part of the procedure.				

Table 3.3: AVDTP Signaling Capabilities

3.2 Transport Services

Once a stream connection is established between the **INT** and the **ACP**, the devices are ready to transport A/V data. AVDTP provides several transport services related to basic transport, quality of service and manipulation of transport packets for efficient use of the bandwidth. These transport services are fully described in Section 5.4 and Chapter 7 of AVDTP [7].

The necessity of these transport services depends on applications. The requirement of these services is described in the application profiles such as Advanced Audio Distribution Profile [1].

3.3 Error codes

Table 3.4 defines an 8-bits ERROR_CODE field that is transported over the air in signaling response messages when an **ACP** device rejects a signaling command message received from a distant **INT** device. The ERROR_CODE field received from an **ACP** device is exposed to the **INT** application through the AVDTP service interface. The range 0xC0-0xFF is reserved for the profile residing on top GAVDP.

Error ID	Related Signaling command	Error Abbreviation	Error Description
0x80	Set Configuration	BAD_SERVICE	The service category stated is invalid.
0x81	Set Configuration	INSUFFICIENT_RESOURCE	Lack of resource new Stream Context.

Table 3.4: ACP-Upper Layer to INT-AVDTP Signal Response Error Codes

4 L2CAP Procedures

The following text together with the associated sub-clauses defines the mandatory requirements with regard to this profile.

	Procedure	**Support**
1.	Channel types	
	Connection-oriented channel	M
	Connectionless channel	X1
2.	Signaling	
	Connection establishment	M
	Configuration	M
	Connection Termination	M
	Echo	M
	Command Rejection	M
3.	Configuration Parameter Options	
	Maximum Transmission Unit	M
	Flush Timeout	M
	Quality of Service	O
X1: Connectionless channel is not used within the execution of this profile, but concurrent use by other profiles/applications is not excluded.		

Table 4.1: L2CAP Capabilities

4.1 Channel Types

In this profile, only connection-oriented channels shall be used. This implies that broadcasts shall not be used in this profile.

The AVDTP PSM value is used in the L2CAP connection request. See the Bluetooth Assigned Numbers [8] for the AVDTP PSM.

4.2 Signaling

Only the **INT** issues an L2CAP Connection Request within the execution of *Connection Establishment* procedure in this profile. (See Section 3.1.1) The GAVDP does not impose any additional restrictions or requirements on L2CAP signaling.

4.3 Configuration Options

This section describes the usage of the configuration options in this profile.

4.3.1 Flush Timeout

It is critical that the audio and/or video be streamed with no interruptions. To accomplish this, it is necessary that the L2CAP configuration settings and flush timeout are set appropriately.

Remark: Flush timeout can be constrained by the ACL channels when other profile(s) coexist with GAVDP.

4.3.2 Quality of Service

The QoS parameters for transport channels should be used according to the requirements of the traffic.

5 Link Manager (LM) Procedures

The procedure for SCO links is excluded in this profile. Except for this, there is no change to the requirements as stated in the Link Manager specification itself.

6 Link Controller (LC) Procedures

There are no changes to core requirements for Link Controller.

6.1 Encryption Pause and Resume

Operations requiring encryption pause and resume should not be performed in the GAVDP STREAMING state. Since all ACL data is paused during this time, it can have an adverse effect on media quality. For example, a role switch or encryption key refresh should not be requested while in a streaming state.

7 Generic Access Profile Interoperability Requirements

The General Audio/Video Distribution Profile requires compliance to the Generic Access Profile.
This section defines the support requirements for the capabilities as defined in the Generic Access Profile.

7.1 Security Aspects

There is no change to the requirements as stated in the Generic Access Profile.

7.2 Idle Mode Procedures

Table 7.1 shows the support status for Idle mode procedures within this profile.

	Procedure	**Support in INT**	**Support in ACP**
1.	General inquiry	M	X
2.	Limited inquiry	O	X
3.	Name discovery	O	X
4.	Device discovery	O	X
5.	Bonding	O*	O*
* Whenever supported, the INT shall at least support initiation of bonding, and the ACP at least acceptance of bonding.			

Table 7.1: Supported Idle Mode Procedures

8 Timers

The timers defined in Table 8.1 are required by GAVDP.

Timer name	Proposed value	Description	Comments
$T_{GAVDP}100$	0.5~3.0 Seconds	Signaling transaction timer	

Table 8.1: Timers

9 Testing

The Generic Audio/Video Distribution Profile requires conformance test. The details of the test strategy are described in [10]. Tested functionality is defined in [9].

10 References

[1] Advanced Audio Distribution Profile, Specification version 1.3 or later

[2] Bluetooth Core Specification, Generic Access Profile Version 2.1+EDR or later

[3] Bluetooth Core Specification, Baseband Version 2.1+EDR or later

[4] Bluetooth Core Specification, LMP Version 2.1+EDR or later

[5] Bluetooth Core Specification, L2CAP Version 2.1+EDR or later

[6] Bluetooth Core Specification, SDP Version 2.1+EDR or later

[7] Audio/Video Distribution Transport Protocol, Specification Version 1.3 or later

[8] Bluetooth SIG, Bluetooth Assigned Numbers

[9] Generic Audio/Video Distribution Profile, ICS Proforma

[10] Generic Audio/Video Distribution Profile Test Specification

[11] ITU Recommendation BT.1359-1 (11/98) Relative timing of sound and vision for broadcasting

11 List of Figures

12 List of Tables

13 Appendix A (Informative): Signaling Flows

This appendix contains a typical combination of signaling procedures defined in this profile. This appendix is informative only. The diagrams do not represent all possible combination of signaling flows as defined by this profile.

13.1 Definitions

In this appendix the **SRC** and the **SNK** are used for the role of devices to clarify the flow of procedures in the actual device implementation. The **SRC** (**SNK**) is the device that can send (receive) A/V streaming data. For reference, see Section 2.2 in Advanced Audio Distribution Profile.

In the following diagrams the **SRC** is assumed to be the **INT**, while the **SNK** to be the **ACP**. However, the **INT**/**ACP** roles are flexible; for example, it is possible that the **SRC** initiates the *Connection Establishment* procedure, followed by a *Start Streaming* procedure initiated by the **SNK**. It depends on the implementation.

The diagrams contain procedures defined in different profiles. <procedure>, <procedure*>, and <procedure**> indicate GAVDP, GAP [2] and SDP [6] procedures, respectively.

13.2 Streaming Set up and Release

Figure 13.1 shows an example of signaling flows covering the initial device discovery, service discovery, and streaming connection establishment. The diagram fully contains a series of procedures necessary to set up and release the streaming connection defined in this profile.

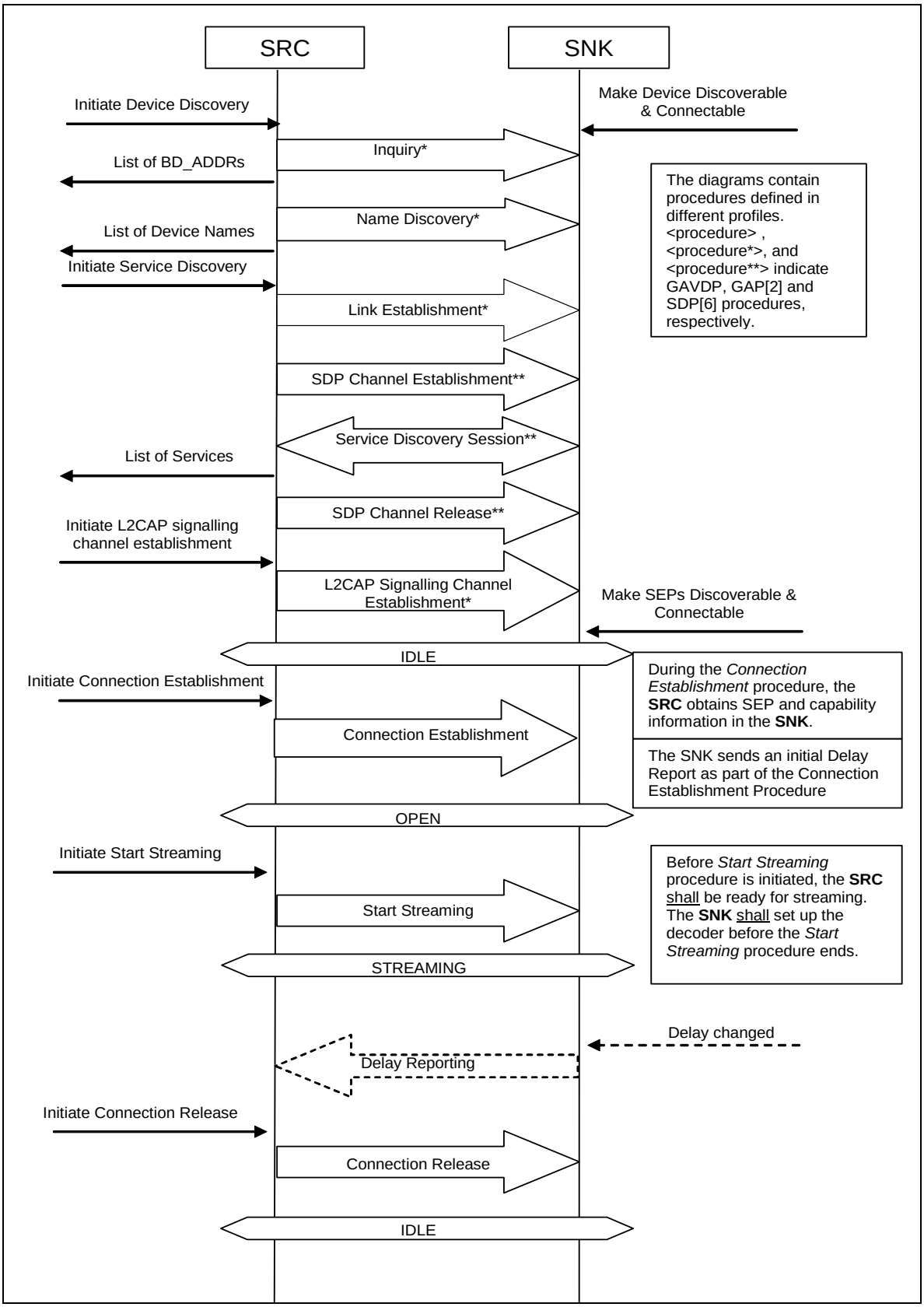

Figure 13.1: Streaming setup and release

13.3 Streaming Suspend and Resume

Figure 13.2 shows a series of procedures used to suspend the streaming or change streaming parameters.

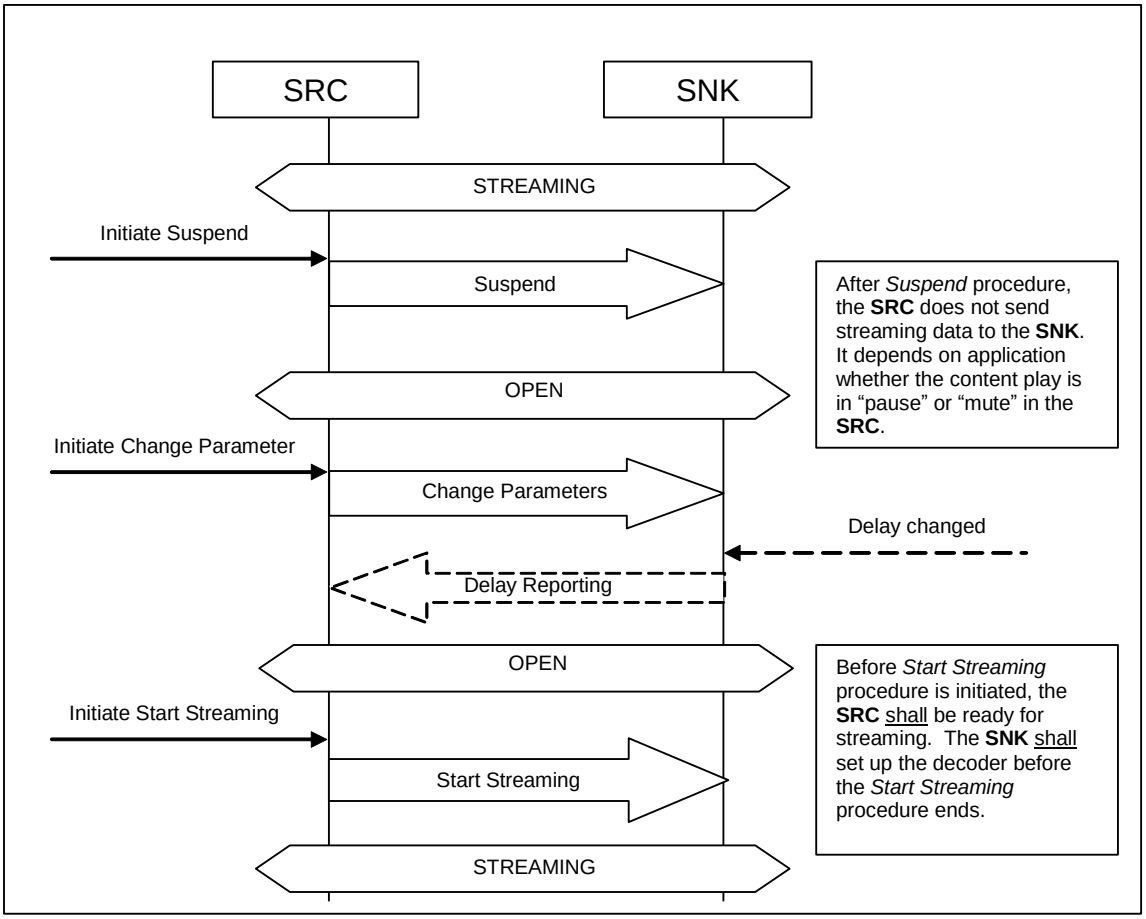

Figure 13.2: Streaming suspend and resume

14 Appendix B: Acronyms and Abbreviations

Acronym	Description
A/V	Audio/Video
ACP	Acceptor
AVDTP	Audio/Video Distribution Transport Protocol
GAP	Generic Access Profile
GAVDP	Generic Audio/Video Distribution Profile
ICS	Implementation Conformance Statement
INT	Initiator
LC	Link Controller
MTU	Maximum Transmission Unit
PSM	Protocol/Service Multiplexer
SDP	Service Discovery Protocol
SEP	Stream End Point
SNK	Sink
SRC	Source