

Volume Control Profile (VCP)

Bluetooth® Implementation Conformance Statement (ICS) Proforma

- **Revision:** VCP.ICS.p3
- **Revision Date:** 2025-02-18
- **Prepared By:** Generic Audio Working Group
- **Published during TCRL:** TCRL.2025-1



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1 General principles

1.1 Implementation Under Test (IUT) identification

Using the Bluetooth SIG qualification tool, the implementer is expected to declare details about what will be implemented.

1.2 Enforcement of inter-layer dependencies

This ICS includes one or more tables with inter-layer dependencies (ILDs). ILDs are used for specification requirements that are dependent on other supporting specifications. ILDs can refer to an individual ICS item in a separate layer (individual ILD), or it can refer to the full layer (full-layer ILD).

ILDs residing in an X2Core layer will be enforced from the Bluetooth SIG qualification tool in the following conditions, depending on where the referred ILD is residing:

Referred ILD resides in	Individual ILD	Full-layer ILD
Controller layer	Core-Complete configuration, or Referred layer is supported	N/A
Lower HCI layer	HCI is supported	N/A
Upper HCI layer	Core-Host configuration, or UHCI is supported	N/A
Host layer	Core-Host configuration, or Core-Complete configuration, or Referred layer is supported	N/A
X2Core layer	Core-Host configuration, or Core-Complete configuration, or Referred layer is supported	Core-Host configuration, or Core-Complete configuration

Table 1.1: Enforcement of an ILD within the Bluetooth SIG qualification tool

2 ICS declarations

2.1 Roles

Table 1: Role Requirements

Item	Role	Reference	Status
1	Volume Renderer	[1] 3.0	C.1
2	Volume Controller	[1] 4.0	C.1

C.1: Mandatory to support at least one.

2.2 Transports

Table 2: Transport Requirements

Item	Transport	Reference	Status
1	Profile supported over BR/EDR	[1] 2.4	C.1
2	Profile supported over LE	[1] 2.4	C.1

C.1: Mandatory to support at least one.

2.3 Volume Renderer role

Table 3: Volume Renderer, X.Y Versions

Prerequisite: VCP 1/1 "Volume Renderer"

Item	Version	Reference	Status
1	VCP v1.0	[1]	M

Table 4: Volume Renderer, X.Y.Z Versions

Table number reserved but not yet in use

2.3.1 Services – Volume Renderer role

Table 5: Service Requirements

Prerequisite: VCP 1/1 "Volume Renderer"

Item	Capability	Reference	Status	Inter-Layer Dependency
1	Volume Control Service	[1] 3.0	M	[6] VCS
2	Volume Offset Control Service	[1] 3.0	O	[4] VOCS
3	Audio Input Control Service	[1] 3.0	O	[5] AICS
4	LE Extended Advertising	[1] 6.1.1.1	M	[7] LL 9/41

2.3.2 GAP requirements

Table 6: GAP Requirements – Volume Renderer Role

Prerequisite: VCP 1/1 “Volume Renderer”

Item	Capability	Reference	Status	Inter-Layer Dependency
1	LE security mode 1	[1] 5.1	C.1	[3] GAP 25/1
2	Unauthenticated Pairing (LE security mode 1 level 2) with LE Secure Connections Pairing only	[1] 5.1	C.1	[3] GAP 25/11
3	Authenticated Pairing (LE security mode 1 level 3) with LE Secure Connections Pairing only	[1] 5.1	C.3	[3] GAP 25/12
4	Derivation of LE LTK from BR/EDR Link Key	[1] 5.1	C.6	[3] GAP 43/2b
5	Security mode 4, level 2	[1] 5.2	C.2	[3] GAP 2/7c
6	128-bit encryption key size capable (BR/EDR)	[1] 5.2	C.2	[3] GAP 2/13
7	Derivation of BR/EDR Link Key from LE LTK	[1] 5.2	C.7	[3] GAP 43/2a
8	Minimum 128 Bit entropy key (LE)	[1] 5.1	C.1	[3] GAP 25/13
9	BR/EDR Secure Connections	[1] 5.2	C.7	N/A
10	LE Secure Connections (Peripheral)	[1] 5.1	C.6	[3] GAP 27b/5
11	Out of Band (Peripheral)	[1] 5.1	C.6	[3] GAP 27b/9
12	Out-of-Band (BR/EDR)	[1] 5.2	C.7	[3] GAP 2/14
13	Peripheral	[1] 4.1	C.1	[3] GAP 5/3 OR GAP 38/3

C.1: Mandatory IF VCP 2/2 “Profile supported over LE”, otherwise not defined.

C.2: Mandatory IF VCP 2/1 “Profile supported over BR/EDR”, otherwise not defined.

C.3: Optional IF VCP 2/2 “Profile supported over LE”, otherwise not defined.

C.4–C.5: No longer used.

C.6: Mandatory to support at least one IF VCP 2/2 “Profile supported over LE”, otherwise not defined.

C.7: Mandatory to support at least one IF VCP 2/1 “Profile supported over BR/EDR”, otherwise not defined.

2.4 Volume Controller role

Table 8: Volume Controller, X.Y Versions

Prerequisite: VCP 1/2 “Volume Controller”

Item	Version	Reference	Status
1	VCP v1.0	[1]	M

Table 9: Volume Controller, X.Y.Z Versions

Table number reserved but not yet in use



2.4.1 Services Support – Volume Controller role

Table 10: Volume Control Service Support

Prerequisite: VCP 1/2 “Volume Controller”

Item	Capability	Reference	Status
1	Discover Volume Control Service	[1] 4.0	M
2	Discover Volume Offset Control Service	[1] 4.0	O
3	Discover Audio Input Control Service	[1] 4.0	O

Table 11: Volume Control Service Characteristic Support Requirements

Prerequisite: VCP 10/1 “Discover Volume Control Service”

Item	Capability	Reference	Status
1	Volume State	[1] 4.3.1	M
2	Volume Control Point	[1] 4.3.1	M
3	Volume Flags	[1] 4.3.1	O

Table 12: Volume Control Service Procedure Support Requirements

Prerequisite: VCP 10/1 “Discover Volume Control Service”

Item	Capability	Reference	Status
1	Configure Volume State Notifications	[1] 4.4.1, 4.4.1.1	M
2	Read Volume State	[1] 4.4.1, 4.4.1.2	M
3	Configure Volume Flags Notifications	[1] 4.4.1, 4.4.1.3	O
4	Read Volume Flags	[1] 4.4.1, 4.4.1.4	O
5	Set Initial Volume	[1] 4.4.1, 4.4.1.5	C.1
6	Set Absolute Volume	[1] 4.4.1, 4.4.1.6.5	C.2
7	Relative Volume Down	[1] 4.4.1, 4.4.1.6.1	C.3
8	Relative Volume Up	[1] 4.4.1, 4.4.1.6.2	C.3
9	Unmute/ Relative Volume Down	[1] 4.4.1, 4.4.1.6.3	C.4
10	Unmute/ Relative Volume Up	[1] 4.4.1, 4.4.1.6.4	C.4
11	Mute	[1] 4.4.1, 4.4.1.6.6	O
12	Unmute	[1] 4.4.1, 4.4.1.6.7	O

- C.1: Optional IF VCP 12/4 “Read Volume Flags” OR VCP 12/6 “Set Absolute Volume”, otherwise Excluded.
- C.2: Mandatory IF NOT VCP 12/7 “Relative Volume Down” AND NOT VCP 12/8 “Relative Volume Up” AND NOT VCP 12/9 “Unmute/ Relative Volume Down” AND NOT VCP 12/10 “Unmute/ Relative Volume Up”, otherwise Optional.
- C.3: Mandatory to support none or all.
- C.4: Mandatory to support none or all.

Table 13: Volume Offset Control Service Characteristic Support Requirements*Prerequisite: VCP 10/2 "Discover Volume Offset Control Service"*

Item	Capability	Reference	Status
1	Volume Offset State	[1] 4.3.2	C.1
2	Audio Location	[1] 4.3.2	O
3	Volume Offset Control Point	[1] 4.3.2	O
4	Audio Output Description	[1] 4.3.2	O

C.1: Mandatory IF VCP 14/1 "Configure Offset State Notifications" OR VCP 14/2 "Read Volume Offset State" OR VCP 14/3 "Configure Audio Location Notifications" OR VCP 14/4 "Read Audio Location" OR VCP 14/5 "Set Audio Location" OR VCP 14/6 "Set Volume Offset" OR VCP 14/7 "Configure Audio Output Description Notifications" OR VCP 14/8 "Read Audio Output Description" OR VCP 14/9 "Set Audio Output Description", otherwise Optional.

Table 14: Volume Offset Control Service Procedure Support Requirements*Prerequisite: VCP 10/2 "Discover Volume Offset Control Service"*

Item	Capability	Reference	Status
1	Configure Offset State Notifications	[1] 4.4.2.1	C.1, C.2
2	Read Volume Offset State	[1] 4.4.2.2	C.1, C.2
3	Configure Audio Location Notifications	[1] 4.4.2.3	O
4	Read Audio Location	[1] 4.4.2.4	O
5	Set Audio Location	[1] 4.4.2.5	O
6	Set Volume Offset	[1] 4.4.2.6.1	O
7	Configure Audio Output Description Notifications	[1] 4.4.2.7	O
8	Read Audio Output Description	[1] 4.4.2.8	O
9	Set Audio Output Description	[1] 4.4.2.9	O

C.1: Mandatory IF VCP 14/3 "Configure Audio Location Notifications" OR VCP 14/4 "Read Audio Location" OR VCP 14/5 "Set Audio Location" OR VCP 14/6 "Set Volume Offset" OR VCP 14/7 "Configure Audio Output Description Notifications" OR VCP 14/8 "Read Audio Output Description" OR VCP 14/9 "Set Audio Output Description", otherwise Optional.

C.2: Mandatory to support none or all.

Table 15: Audio Input Control Service Characteristic Support Requirements*Prerequisite: VCP 10/3 "Discover Audio Input Control Service"*

Item	Capability	Reference	Status
1	Audio Input State	[1] 4.3.3	C.1
2	Gain Setting Properties	[1] 4.3.3	C.1
3	Audio Input Type	[1] 4.3.3	O
4	Audio Input Status	[1] 4.3.3	O

Item	Capability	Reference	Status
5	Audio Input Control Point	[1] 4.3.3	O
6	Audio Input Description	[1] 4.3.3	O

C.1: Mandatory IF VCP 16/1 “Configure Audio Input State Notifications” OR VCP 16/2 “Read Audio Input State” OR VCP 16/3 “Read Gain Setting Properties” OR VCP 16/4 “Read Audio Input Type” OR VCP 16/5 “Configure Audio Input Status Notifications” OR VCP 16/6 “Read Audio Input Status” OR VCP 16/7 “Set Gain Setting” OR VCP 16/8 “Mute” OR VCP 16/9 “Unmute” OR VCP 16/10 “Set Manual Gain Mode” OR VCP 16/11 “Set Automatic Gain Mode” OR VCP 16/12 “Configure Audio Input Description Notifications” OR VCP 16/13 “Read Audio Input Description” OR VCP 16/14 “Set Audio Input Description”, otherwise Optional.

Table 16: Audio Input Control Service Procedure Support Requirements

Prerequisite: VCP 10/3 “Discover Audio Input Control Service”

Item	Capability	Reference	Status
1	Configure Audio Input State Notifications	[1] 4.4.3.1	C.1, C.2
2	Read Audio Input State	[1] 4.4.3.2	C.1, C.2
3	Read Gain Setting Properties	[1] 4.4.3.3	O
4	Read Audio Input Type	[1] 4.4.3.4	O
5	Configure Audio Input Status Notifications	[1] 4.4.3.5	O
6	Read Audio Input Status	[1] 4.4.3.6	O
7	Set Gain Setting	[1] 4.4.3.7.1	O
8	Mute	[1] 4.4.3.7.3	O
9	Unmute	[1] 4.4.3.7.2	O
10	Set Manual Gain Mode	[1] 4.4.3.7.4	O
11	Set Automatic Gain Mode	[1] 4.4.3.7.5	O
12	Configure Audio Input Description Notifications	[1] 4.4.3.8	O
13	Read Audio Input Description	[1] 4.4.3.9	O
14	Set Audio Input Description	[1] 4.4.3.10	O

C.1: Mandatory IF VCP 16/3 “Read Gain Setting Properties” OR VCP 16/4 “Read Audio Input Type” OR VCP 16/5 “Configure Audio Input Status Notifications” OR VCP 16/6 “Read Audio Input Status” OR VCP 16/7 “Set Gain Setting” OR VCP 16/8 “Mute” OR VCP 16/9 “Unmute” OR VCP 16/10 “Set Manual Gain Mode” OR VCP 16/11 “Set Automatic Gain Mode” OR VCP 16/12 “Configure Audio Input Description Notifications” OR VCP 16/13 “Read Audio Input Description” OR VCP 16/14 “Set Audio Input Description”, otherwise Optional.

C.2: Mandatory to support none or all.

2.4.2 GATT requirements

Table 17: Volume Controller GATT Requirements

Prerequisite: VCP 1/2 “Volume Controller”

Item	Capability	Reference	Status	Inter-Layer Dependency
1	Discover All Primary Services	[1] 4.1	C.1	[2] GATT 3/2
2	Discover Primary Services by Service UUID	[1] 4.1	C.1	[2] GATT 3/3



Item	Capability	Reference	Status	Inter-Layer Dependency
3	Find Included Services	[1] 4.1	C.3	[2] GATT 3/4
4	Discover All Characteristics of a Service	[1] 4.1	C.2	[2] GATT 3/5
5	Discover Characteristics by UUID	[1] 4.1	C.2	[2] GATT 3/6
6	Discover All Characteristic Descriptors	[1] 4.1	M	[2] GATT 3/7
7	Read Characteristic Value	[1] 4.1	M	[2] GATT 3/8
8	Write Characteristic Value	[1] 4.1	M	[2] GATT 3/14
9	Single Notification	[1] 4.1	M	[2] GATT 3/17
10	Read Characteristic Descriptors	[1] 4.1	M	[2] GATT 3/19
11	Write Characteristic Descriptors	[1] 4.1	M	[2] GATT 3/21

C.1: Mandatory to support at least one.

C.2: Mandatory to support at least one.

C.3: Mandatory IF VCP 16/1 “Configure Audio Input State Notifications” OR VCP 14/1 “Configure Offset State Notifications” otherwise Optional.

2.4.3 GAP requirements

Table 18: GAP Requirements – Volume Controller Role

Prerequisite: VCP 1/2 “Volume Controller”

Item	Capability	Reference	Status	Inter-Layer Dependency
1	Central	[1] 4.1	C.2	[3] GAP 5/4 OR GAP 38/4
2	LE security mode 1	[1] 5.1	C.2	[3] GAP 35/1
3	Bondable mode (LE)	[1] 6.2	C.2	[3] GAP 34/2
4	Bonding procedure	[1] 6.2	C.3	[3] GAP 34/3
5	Initiation of dedicated bonding	[1] 6.3	C.1	[3] GAP 3/6
6	Unauthenticated Pairing (LE security mode 1 level 2) with LE Secure Connections Pairing only	[1] 5.1	C.2	[3] GAP 35/11
7	Authenticated Pairing (LE security mode 1 level 3) with LE Secure Connections Pairing only	[1] 5.1	C.3	[3] GAP 35/12
8	Derivation of LE LTK from BR/EDR Link Key	[1] 5.1	C.7	[3] GAP 41/2b
9	Security mode 4, level 2	[1] 5.2	C.4	[3] GAP 2/7c
10	128-bit encryption key size capable (BR/EDR)	[1] 5.2	C.4	[3] GAP 2/13
11	Derivation of BR/EDR Link Key from LE LTK	[1] 5.2	C.8	[3] GAP 41/2a
12	Minimum 128 Bit entropy key (LE)	[1] 5.1	C.2	[3] GAP 35/13
13	BR/EDR Secure Connections	[1] 5.2	C.8	N/A
14	LE Secure Connections (Central)	[1] 5.1	C.7	[3] GAP 37b/5

Item	Capability	Reference	Status	Inter-Layer Dependency
15	Out of Band (Central)	[1] 5.1	C.7	[3] GAP 37b/9
16	Out-of-Band (BR/EDR)	[1] 5.2	C.8	[3] GAP 2/14

C.1: Optional IF VCP 2/1 “Profile supported over BR/EDR”, otherwise not defined.

C.2: Mandatory IF VCP 2/2 “Profile supported over LE”, otherwise not defined.

C.3: Optional IF VCP 2/2 “Profile supported over LE”, otherwise not defined.

C.4: Mandatory IF VCP 2/1 “Profile supported over BR/EDR”, otherwise not defined.

C.5–C.6: No longer used.

C.7: Mandatory to support at least one IF VCP 2/2 “Profile supported over LE”, otherwise not defined.

C.8: Mandatory to support at least one IF VCP 2/1 “Profile supported over BR/EDR”, otherwise not defined.

3 References

- [1] Volume Control Profile Specification, Version 1.0
- [2] ICS Proforma for Generic Attribute Profile (GATT)
- [3] ICS Proforma for Generic Access Profile (GAP)
- [4] ICS Proforma for Volume Offset Control Service (VOCS)
- [5] ICS Proforma for Audio Input Control Service (AICS)
- [6] ICS Proforma for Volume Control Service (VCS)
- [7] ICS Proforma for Link Layer (LL)

4 Revision history and acknowledgments

Revision History

Publication Number	Revision Number	Date	Comments
0	p0	2020-12-22	Approved by BTI on 2020-11-29. VCP v1.0 adopted by the BoD on 2020-12-15. Prepared for publication.
	p0ed2 r00–r02	2021-03-23 – 2021-05-23	TSE 15974 (rating 1): Fixed typos in Table 12. Editorials for consistency checker findings.
	p0 edition 2	2021-05-25	Approved by BTI on 2021-05-06. Prepared for edition 2 publication.
	p0ed3 r00–r01	2021-07-26 – 2021-09-24	TSE 16976 (rating 1): Corrected conditional wording for C.1 of Table 12. (NOTE: Other changes tracked in this CR were made in the edition 2 publication.) Consistency checker editorials to align with wording in the latest ICS template.
	p0 edition 3	2021-09-28	Approved by BTI on 2021-09-27. Prepared for edition 3 publication.
	p0ed4r00	2022-01-25	TSE 18189 (rating 1): Updated Link Layer inter-layer dependency item in Table 5 to align with updates made in the LL ICS. Made template-related fixes, including aligning the copyright page with v2 of the DNMD.
	p0 edition 4	2022-01-27	Approved by BTI on 2022-01-27. Prepared for edition 4 publication.
	p1r00	2022-02-24	TSE 18371 (rating 2): Removed “is/not supported” language in the conditionals globally, and updated references for Table 12. Performed template-related formatting fixes. Fixed cross-reference formatting where possible.
1	p1	2022-06-28	Approved by BTI on 2022-06-20. Prepared for TCRL 2022-1 publication.
	p1ed2r00	2023-02-15	TSE 22637 (rating 1): Replaced ILD references to Security Manager 8/1 with SM 8a/1 (for Central role) or SM 8b/1 (for Peripheral role) in Tables 7 and 19. Updated references. Editorials to align the document with the latest ICS template. Deleted draft revision history comments prior to p0.
	p1 edition 2	2023-03-15	Approved by BTI on 2023-03-13. Prepared for edition 2 publication.
	p2r00–r03	2023-08-09 – 2023-11-28	TSE 23339 (rating 2): Removed the reference to the SM ICS and updated cross-refs accordingly. Added 6/3a, 6/5a, 6/5b, 6/9, 6/10, 6/11, 6/12, 6/13, and 6/14 and C.6 – C.12, and updated C.4 and C.5 and the status for 6/4 and 6/7. Deleted Table 7 (the SM Requirements section). Revised the capability descriptions for 10/1, 10/2, and 10/3. Added 18/7a, 18/9a, 18/9b, 18/13, 18/14, 18/15, 18/16, 18/17, and 18/18 and C.7 – C.12, and updated C.5 and C.6 and the status for 18/8 and 18/11. Deleted Table 7 (the SM Requirements section).

Publication Number	Revision Number	Date	Comments
2	p2	2024-07-01	Approved by BTI on 2024-04-21. Prepared for TCRL 2024-1 publication.
	p3r00–r02	2024-11-08 – 2024-12-06	TSE 24997 (rating 2): Per E24427, added conditional C.3 to Table 17 and updated the Status value for Item 3 to reference C.3.
3	p3	2025-02-18	Approved by BTI on 2025-02-09. Prepared for TCRL 2025-1 publication.

Acknowledgments

Name	Company
Gene Chang	Bluetooth SIG, Inc.
Charlie Lenahan	Bluetooth SIG, Inc.
Jawid Mirani	Bluetooth SIG, Inc.